DOCUMENT RESUME

ED 035 933 CG 004 951

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TITLE A DETAILED ANALYSIS OF SIXTH GRADE CREATIVITY TEST DATA.
INSTITUTION STATE UNIV. OF NEW YORK, ONEONTA. COLL. AT ONEONTA.
SPONS AGENCY OFFICE OF EDUCATION (DHEW), WASHINGTON, D.C.
PUB DATE JUN 69
NOTE 95P.

EDRS PRICE EDRS PRICE MF-$0.50 HC-$4.85
DESCRIPTORS CREATIVITY, *CREATIVITY RESEARCH, *DATA ANALYSIS, *ELEMENTARY SCHOOL STUDENTS, EVALUATION, ITEM ANALYSIS, RESEARCH PROJECTS, *TEST CONSTRUCTION, *TESTING, TEST RELIABILITY, TESTS, TEST VALIDITY

ABSTRACT

RESEARCH OBJECTIVES WERE: (1) TO ESTABLISH NORM DATA FROM A BATTERY OF CREATIVITY TESTS, (2) TO OBTAIN FREQUENCY OF RESPONSE SCORES FOR THE ORIGINALITY SUB-TEST (GUILFORD) TO COMPARE WITH SCORER JUDGMENT TYPE "REMOTE" SCORES, (3) TO PERFORM AN ITEM ANALYSIS, (4) TO ANALYZE AND REPORT ON THE RELATIONSHIP OF CREATIVITY, SOCIO-ECONOMIC STATUS, I.Q., AND SEX WITH VALIDITY OBTAINED FROM A PEER NOMINATION AND INTERESTS AND ACTIVITY INVENTORY; AND (5) TO ANALYZE CONSTRUCT VALIDITY BY FACTOR ANALYSIS. APPROXIMATELY 900 CHILDREN WERE PRE-POST TESTED ON A BATTERY OF TESTS. CONCLUSIONS WERE: (1) THE BATTERY NEEDS REVISION, (2) THE REMOTE JUDGMENT METHOD OF SCORING THE CONSEQUENCE TEST FOR ORIGINALITY IS NOT ACCURATE, (3) ACCEPTABLE INTERNAL CONSISTENCY WAS OBTAINED, (4) CONCURRENT VALIDITY WAS ACCEPTABLE, (5) A SATISFACTORY DEGREE OF CONSTRUCT VALIDITY EXISTED, AND (6) THE GESTALT REDEFINITION TEST, THE ALTERNATE USES TEST, THE SEEING PROBLEMS TEST, AND THE CONSEQUENCES TEST WERE RELIABLE AND VALID. FURTHER STUDIES NEED TO DETERMINE THE EFFECT OF THE TEST SITUATION AND SCORING PROCEDURES UPON CREATIVITY SCORES. (AUTHOR/EK)

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by David A. Denny
Professor of Education

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A Project Supported by a Grant-In-Aid from

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ACKNOWLEDGEMENT

The author wishes to recognize the financial support provided by the United States Office of Education in the initial study of which this is a continuation. He also wishes to thank the State University of New York Awards Committee for funding the project to conduct the analysis reported here.

Student assistants deserving special mention are JoAnne Bennett, Donna Thomas and Evann Sideris.

The cooperation of the State University College at Oneonta is also appreciated, especially the clerical staff and in particular Marianna Leib and Jalna Osborne.

The advice of colleagues was also appreciated.

D. A. D.
June, 1969

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CHAPTER I

INTRODUCTION

Background

Although there have always been philosophical theories dealing with man's creativity, it has only been within the past decade that research psychologists and educators have taken a great interest in identifying creativity and developing tests of creative ability. Pioneering in the development of tests with which to assess the "creative" aspects of the intellect has been J. P. Guilford of the University of Southern California (1956). Although some criticism is voiced regarding such tests of creativity (Thorndike, 1963) subsequent studies by Guilford and others using similar tests seem to substantiate the effectiveness of such tests for at least identifying aspects of the intellect which are different from those commonly measured by standard I.Q. tests (De Boer, 1965; Olshin, 1963; Sherman, 1965). These aspects of the intellect may be called "creativity."

The use of such "creativity" tests has been limited by insufficient data regarding norms and by conflicting and confusing relationships observed between I.Q. levels and obtained creativity test scores. This need for more data regarding pupils tested using these devices has been particularly acute at the elementary school level since most of Guilford's research was with air force cadets, college age and high school subjects.

A revised battery of Guilford's tests was administered to a large group of sixth grade children in central Indiana in 1965-66 as part of a project jointly sponsored by Indiana University and the U. S. Office of Education. This group of approximately 900 students appears to be the largest single group to be tested at this grade level with these tests. The results of this testing were only partially analyzed in the original study and have not been reported beyond the USOE final report (Denny, 1966).

The Problem

The purpose of the present study was to conduct a detailed analysis of the test data obtained from the approximately 900 sixth grade children in central Indiana in 1965-66 using some of the Guilford tests of creativity. It was believed that dissemination of the results of an analysis of these tests would serve as a source of comparison by school personnel should they administer the same or similar tests. Furthermore, it was believed the analysis would also contribute to the basic store of knowledge regarding the "creative" aspects of the intellect, purported to be measured by these tests.

More specifically, the objectives of the study were as follows:

1. To establish norm data from the battery of creativity tests administered to an Indiana population of sixth grade pupils in 1965-66.

2. To obtain frequency of response scores for the originality sub-tests and to compare these scores with scorer judgment type "remote" scores initially obtained. To also examine the type and frequency of response in relation to socio-economic status, sex and I.Q. levels in order to estimate item validity for each level.

3. To perform an item analysis for each item in the battery of tests.

4. To analyze and report on the relationships of measured creativity, socio-economic status, I.Q. and sex, with validity estimates (criterion) obtained from a peer nomination and interest and activity inventory.

5. To analyze construct validity by conducting a factor analysis of the test data.

6. To prepare a report of the results of the analysis together with detailed administration and scoring directions for distribution to interested persons and to publish at least one journal article detailing the results.

CHAPTER II

REVIEW OF RELATED RESEARCH

Although as long ago as 1898 Dearborn investigated the relative independence of intelligence and imagination, it has been during only the last fifteen years that educational research has concentrated its attention on this area (1898). Also during this time there has been a marked increase in articles and books dealing with the topic in more subjective terms. Perhaps the increased interest has been unfortunate for it has resulted in the misconception by the general public and many professional educators that the research on creativity is much more definitive than it actually is. As a matter of fact, much of the research has been poorly designed and unjustifiable conclusions have been drawn (Thorndike, 1963; Skager, 1966).

Relationships to General Intelligence

The critics have pointed out that in a number of studies the restricted range of intelligence of the samples tested has resulted in faulty conclusions about the relationship of intelligence to creativity measures (Wodtke, 1963, 1964; Skager, 1966; Olshin, 1963; Pogue, 1965; Rambo, 1964), yet subsequent research with adequate range has indicated that the aspects measured as "creative" by so-called creativity tests, although positively correlated with measured intelligence, are not highly so (they range from .20 to .41), especially in the group beyond 120 I.Q. (Schwartz, 1965; Sherman, 1965).

A number of studies have attempted to determine if creativity is a psychologically independent entity. Considerable evidence indicates it is not since the criterion variables often used to validate creativity tests are also highly correlated with intelligence measures. Two reasons are proposed for the observed relationship with intelligence (Wallach, 1968). These are, (1) both tests share a common method variance and (2) the definition of creativity is very similar to that for general intelligence. However, it can also be argued that such an attempt to psychologically isolate creativity measures is spurious. It would appear reasonable to assume, as does Guilford, that we are dealing with related yet varied aspects of intellect.

> ... most of the abilities in the structure of the intellect may play appreciable roles in the complete operation of invention. The cognitive abilities are basic. Without having information there is no intellectual performance of any kind. (1962 p. 163)

Another line of attack on the idea of a separate entity for creativity is found in the low positive intercorrelations of creativity tests. It is

argued these should be much higher if they are measures of the same entity (Thorndike, 1963).

A conservative conclusion seems to be that there are aspects of the intellect which are not measured by standard intelligence tests, but these are all aspects of a whole and are interrelated. These could be called "creative" aspects of the intellect by virtue of their function. As originally developed through the independent research of Guilford (1956) and Lowenfeld (Lowenfeld and Beittel, 1959) these are defined as fluency, flexibility, sensitivity, originality, and redefinition.

Tests of these "creative" aspects have been developed and have undergone revision by Guilford as well as others (Torrance, 1965). The critics have raised the question of the validity of the tests and the aspects they measure. In reply, Guilford presents a realistic view of the problem involved in determining originality. Since there is no way of knowing whether an idea ever existed before and one would need to know the history of the individual to know whether the idea was new to him, there are two ways left to determine originality empirically. One would be to determine the statistical frequency of a response in a population. The other would be to judge its social usefulness, but here subjectiveness enters the picture. Guilford has used factor-analysis to determine related aspects. The next step would be to determine whether these factors relate to "creative" or "gifted" performance. Guilford's studies have only dealt with the factor-analysis stage.

Subsequent studies, in which Guilford's tests or tests purporting to measure similar aspects of creativity are compared to criterion variables, seem to substantiate their independence of intelligence scores for some children (the high creative - low I.Q.'s) and the positive relationship of intelligence and creativity with a correlation at about the .50 level for children below 120 I.Q. (DeBoer, 1965; Olshin, 1963; Sherman, 1965). High creatives are also found to achieve at a high level on standard achievement tests (DeBoer, 1965; Sherman, 1965). Other studies seem to substantiate Guilford's findings that general creativity is rare and that individuals differ in the kind of creativity (symbolic, verbal, concrete) (1962b). Jones noted this difference when semantic creativity tests were found to be related to writing more than to creative drawing (1961). Bowers' study of fourth, fifth, and sixth grade children also demonstrated differentiated aspects of creativity (1960 pp. 141-142). A pilot study by Rusch, Denny, and Ives indicated the same aspects of "creativity" could be used to design a test for the dramatic arts (1964).

One might safely conclude from the research dealing with the identification of the aspects of the intellect, that these aspects are factors, which differ from intelligence as measured, and which have low positive correlations and thus relate to form factors which are varied in pattern and relationship.

Relationships of Creativity to Socio-economic Status, Sex and Age

Findings often conflict regarding the relationship of creativity scores for differing socio-economic levels. Getzels and Jackson cited different parental attitudes for high-creative, high I.Q. subjects

(1962 pp. 62-74). Ellinger, in a study of 458 fourth grade children in Ohio also found a significant relationship between home environment and creativity as measured by Torrance's Tests (1965). Pogue found no relationship between race and creativity but did note a relationship to socio-economic level (1965). In direct contrast Dever found no significant relationship of creativity and parental attitudes as measured by questionnaires of 100 Negro parents in Texas (1964). Orinstein, in a study of second grade children, also failed to find a significant positive relationship of permissiveness, loving attitudes, and democratic attitudes of parents and their child's creativity (1961). The study might be criticized because of the limited size (N=45) and the measures used. At the junior high level, Rambo also failed to find significant differences between high and low creative pupils in regard to parental occupation, parent's educational level, number of children in the family, child's position in the family, and the parent with whom the child lives (1964).

Perhaps a major reason why these conflicting findings are found relative to socio-economic status is the use of global measures of status. There is logical and empirical evidence to indicate that a break-down of the global nature of socio-economic status to specific aspects would be more fruitful. Guilford (1967 pp. 387-392) suggests such factors as cultural advantages of the home (library, radio and TV, et cetera), attitudes and beliefs of parents, and neighborhood features, are related to intellectual level. Taylor (1964, pp. 99-102) believes such factors as success-orientation, peer-orientation, sanctions against questioning and exploration and the work-play dicotomy are forces which oppose creativeness. A recent study by Wade (1968) appears to lend support to these conclusions as regards the home environment. She feels the unique variance of the creative tests (the variance not overlapping with traditional intelligence measures) is subject to environmental stimulation in a manner not shared by the intelligence measures. More specifically she refers to freedom for fantasy behavior. Supporting evidence for this theory was obtained when creativity tests of fluency, flexibility and originality were administered to 105 tenth grade children in the upper middle class. In both professional and non-professional homes, those in which parents approve TV viewing obtained higher mean creativity scores than those in which TV viewing was not approved.

There is considerable evidence to indicate differences in creativity between the sexes. Torrance (1962 pp. 110-114) cites his own research and that of others indicating emphasis on sex roles caused differential creativity test scores. Guilford (1967 pp. 404-405) lists 17 factors which appear to differentiate between males and females. These factors were compiled from a variety of sources and are only those in which a difference is clearly validated. Of the five factors generally considered creative, females appear to be higher in word, ideational and expressional fluency while boys appear to be higher in the divergent and convergent production of figural transformations. However, there is also evidence of a lack of differentiation in mean scores between the sexes on creativity tests (Yamamoto and Chimbidis, 1966; Yamamoto, 1964). Taylor indicates emphasis on sex roles does not appear to inhibit creativity before the age of 5 years. (1964 pp. 78, 100).

Most authors are agreed that there is substantial evidence to indicate

children show less creativity as they grow older, although there is a need for longitudinal studies since many studies have been restricted in range of age (Taylor, 1964 pp. 33, 78-79). Torrance, reporting his own research as well as that of others, shows decrements of creative production at grades 5, 9, and 12 with a peak being reached at about 30 years of age (1962 p. 103; 1965 pp. 107-119). Guilford also indicates evidence that creative production tends to reach its peak at age 30 - 39. There is some variation between occupations which is seemingly related to the amount of preparation necessary to accumulate the basic knowledge with which to be creative (1967 p. 424). The relationship between the socio-economic factors mentioned above and age are quite logical and require further investigation.

Thus it would appear that the relationship between measures of creative and non-creative aspects of the intellect need to be further explored at various age levels. Furthermore, since the relationship of socio-economic status and sex to these measures is not at all clear, the development of age and sex norms and the further exploration of the influence of age, sex, and socio-economic status upon creativity test scores is also desirable. The research reported here is a further step in the direction of the clarification of these relationships.

CHAPTER III

PROCEDURES

The Indiana Study

A revised battery of Guilford's tests was administered to a group of sixth grade children in central Indiana in 1965-66 as part of a project jointly sponsored by Indiana University and the U. S. Office of Education. The tests were administered twice as pre and post measures of creativity in relation to hypotheses relative to teaching behavior related to pupil creative growth (Denny, 1966).

Description of the Sample Tested

Approximately 900 children in 30 classrooms located in four school systems within a 50 mile radius in South-Central Indiana were pre-post tested.* Thirteen classrooms were located in a newly consolidated county-wide school system. Six of these were located in elementary buildings within a municipality and the remaining seven were located in schools which had recently been consolidated. These were typically single buildings housing kindergarten through twelfth grade.

Another school system, similar to the first in that it was a county-wide consolidation, contributed 10 more sixth grade classrooms to the sample. In this case seven of the 10 classrooms were located within the municipality, and the remaining three were located in rural buildings. In none of these cases were the separate buildings a kindergarten through twelfth grade school. All of the buildings had been remodeled to house only elementary grades. The facilities in this school system appeared to be more adequate than in the school system previously described. The classes were not as large, and the buildings and instructional equipment were of a more modern design. This school system evidently had a stronger financial base and had been consolidated a longer period of time than the one previously described. Two classrooms were located in a third school system and were in the same elementary building located within a city. The five remaining classrooms were located in a fourth school system with four of the classrooms in a new, modern elementary building. The remaining classroom was located in a much older elementary building in a socially deprived suburban community.

The sample was not selected as representative of any larger population. However, although not representative of the typical sixth grade population, it may be representative of the sixth grade population in this geographic area.

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* Since absences and incomplete supplementary data influenced the number tested and the available data, the N varies from analysis to analysis.

Table 1 shows the distribution of sex, age, I.Q. and socio-economic status. Socio-economic status was determined using Warner's scale (1949). From this scale a value from one to seven can be assigned which identifies status based on occupation of the child's parents. A score of one is high and seven is low.

The intelligence test scores were obtained from school records. These tests had been administered from two years to two months prior to the time of post-testing. Three intelligence tests were used in these four school systems: the Lorge-Thorndike, the Otis Quick Scoring, and the California Test of Mental Maturity. Although there are difficulties in justifying use of intelligence test scores derived from three different tests, these tests all yield standard deviation I.Q.'s and for this reason the scores were utilized without conversion.

Description of the Test Battery

Although the Guilford tests have been only moderately successful in validation with external criteria (Taylor, 1964, p. 35) they continue to show power to differentiate in factor analytic studies with younger subjects as well as with the adult population (Guilford et. al., 1961; Merrifield, et. al., 1963).

Five basic aspects of creativity have been identified and modified by the research of Guilford. These aspects are Originality, Sensitivity, Fluency, Flexibility and Redefinition (Guilford, 1962 a.). Whether or not the composite score of these tests result in an entity called "creativity" does not appear to be entirely relevant. It is evident, however, that these tests measure unique aspects of the intellect which are not entirely measured by the usual intelligence tests.

A battery of tests designed to measure these five aspects of creativity were developed from those of Guilford's. The battery was initially developed in a pilot study with sixth grade children conducted in New York state during the 1964-65 academic year. The tests, as developed, were essentially the same as those used by Guilford. Revisions usually consisted of minor changes in wording to make them more understandable for sixth grade children. In some cases the number of sub-test items was reduced from those in the original. There were also a few changes in the administration of the tests and in the detail of the directions and examples given which were worked out during this pilot study. Since the tests are copyrighted it is not possible to include them in this publication. However, each aspect of creativity measured by the tests and descriptions of the type of test items is provided in Appendix B.

Administration and Scoring Procedures

Administration. The investigator administered all of the pre-tests and post-tests. Use of a single, trained person to administer the tests was believed to be especially important when using a test battery of this type, in which the attitude and motivation of the pupil is influential. By having one person administer all of the tests, consistency was obtained. The pupils were briefly enlightened as to the purpose of the tests and the study. They were told that the tests would be different from their usual

TABLE 1. DISTRIBUTION OF SEX, IQ, SOCIO-ECONOMIC STATUS, PEER NOMINATION AND ACTIVITY INVENTORY SCORES IN THE POPULATION.*

S-E Status		IQ		Sex		Peer Nomination	Activity Inventory
Level	N	Level	N				
1	41	90-	134	Males	464	X=5.22	X=28.40
2	54	91-119	529	Females	433	SD=6.32	SD=15.34
3	103	120+	153	Total	897	N=566	N=776
4	120	Total	816				
5	260	X=105.63					
6	231	SD=15.08					
7	84	N=778					
Total	893						
X=105.63							
SD=15.08							
N=778							

* Different N's are the result of incomplete data for all cases.

classroom tests and that they would find them fun and something for which they would not need to prepare. They were further cautioned to do their best and were encouraged to employ their original ideas and not to be concerned with handwriting, correct spelling, or proper sentence structure. Every effort was made to build a positive rapport with the class prior to the administration of the tests. There were many evidences that such a rapport was established.

The pre-test was administered in October, the post-test in April. One hour was required for administration of the battery, including the giving of directions.

Alternate forms of the test battery were not available. Since approximately six months intervened between the pre-testing and post-testing, the use of the same form for the post-tests was not considered to be detrimental. There were no evidences of pupil recall of items. The teachers were allowed to remain in the room during the pre-testing and to examine a copy of the test, however a copy was not left with them and they were cautioned not to discuss the test with the children.

Scoring. The tests were scored by four research assistants who had received training for this purpose. This was necessary since only the Gestalt Transformation test was of an objective type. The remaining tests required the student to write out a response which required some judgment on the part of the scorer. Although, in order to establish reliability coefficients, two persons were trained and compared in their scoring for a given test in the battery, in most cases only one person scored a given test for all classrooms for both pre-testing and post-testing. This was done to provide consistency in scoring. Scoring procedures provided by the publisher and by Guilford were used and revised where necessary.

Analysis Procedures

The objectives of the study were accomplished in two phases: those dealing with the further analysis and development of the test battery; and analysis concerned with exploring relationships of creativity with other variables for the population tested.

The establishment of norm data. Means, standard deviations, minimum and maximum scores were computed for the total population and for sub-divisions of sex, I.Q., socio-economic levels and age. These computations were for both pre and post test data. Differences between levels were examined using the t test. Tables of percentile rank and score for the total sample for each sub-test and total battery scores were also computed.

Development of frequency scoring for originality. The originality test was initially scored by trained persons on the basis of detailed directions which discriminated between remote and obvious responses. This was a procedure suggested by Guilford (1959). He points out, however, that this is only one way of determining originality. Another is to ascertain uncommonness of response (statistically infrequent in a given population). There have been no published comparisons of both methods of evaluating originality.

The responses on the post-test consequences questions, previously scored remote or obvious, were listed and coded on IBM cards. These responses were then counted and the frequency of occurrence was used to derive a score. The score consisted of the total number responding minus the frequency of the particular response. Thus, the more frequent the response the lower the score. This procedure is less stringent than that of Wallach and Kogan who considered only the single frequency responses as being original (1965). In the present study originality was considered to be a continuum in which the unique response received the highest score but the response occuring only a few times in the total population also received some credit.

The responses given for each question and their frequencies are reported in Appendix A.

Additionally, the responses were compared to see if there were meaningful differences in frequency and type of response for boys and girls, levels of I.Q. and socio-economic status. The chi-square test was used to select significantly different frequencies of response between levels. This was done in those cases in which ten or more identical responses were registered. The content of the responses was then compared to try to determine reasons for the differences.

Validity and reliability. Estimates of reliability of the tests were obtained by the intercorrelation of items and by test-retest and split-half coefficients for the total test and its sub-tests. A further index of reliability (objectivity) was obtained by examination of scorer agreement when using the directions for arriving at scores for each sub-test.

Two types of validity were examined. Concurrent validity was estimated by determining relationships of the test items, sub-tests and total test scores with two independent measures of creativity. Peer nomination was obtained by administering a questionnaire called "Who Does It?" The students were asked to respond with the name of the boy or girl in the class who would most likely "make up a new game, solve a problem at recess," etc. The questions were designed to indicate creative persons. The students in each class were assigned a score consisting of the total number of nominations received. A questionnaire was also administered to determine which students participated in independent activities considered to be creative in nature. A list of 100 activities called "Things Done On Your Own" was presented and each student was instructed to check those he had participated in during the school year. He was directed to only list those he had done on his own; not those he had been required to do by his teachers, parents, or others. Each student's score was the total number of activities checked. Both of these devices had previously been shown to hold a limited degree of validity (Taylor, 1964, pp. 41-45; Yamamoto, 1964).

Construct validity was estimated by factor analyzing the test data to see if the items resulted in each of the factors which Guilford had previously identified with these items (Merrifield, Guilford, and Gershen, 1963; Guilford, Merrifield and Cox, 1961).

Item analysis. The intercorrelation of items with sub-test and total test scores and correlation with the criterion measures of peer nomination and interest inventory scores was examined to indicate overlap of items, item validity and reliability.

CHAPTER IV

FINDINGS

Norm Data

The Total Population. Tables 2 through 10 present means, standard deviations, minimum and maximum scores for the total population and for sub-divisions of sex, I.Q., socio-economic status and age.

Table 2 presents data for the total population on both pre and post testings. It will immediately be noted that the lower limit of the sub-tests was too high in that the minimum score was zero in all cases. It will also be noted that in the case of Originality-Clever and Originality-Remote the scores were skewed. This should be considered in interpreting other data to be presented relative to the Originality variable in this report.

Sex Differences. In Tables 3 and 4 the same data is presented sub-divided by sex. Table 3 presents pre-test data and Table 4 presents post-test data. The t test was used to compare the mean difference between males and females for each sub-test and the total score. It will be noted that on both pre and post tests the females had a significantly higher total mean score ($p < .01$) than did the males. It is interesting to note that the females also had significantly higher mean scores than did the males on a number of the sub-tests with the exception of the Redefinition test on which the males mean score was significantly higher ($p < .05$ on the pre-test and $p < .01$ on the post-test). This may be a factor of the test content and format. It will be noted later on in this report that the item content for the Gestalt Redefinition Test appears to pertain to the mechanical interests of the male. It will also be noted in Tables 23 and 24 that the Redefinition items do not have as high a correlation with the other items of the test, indicating a dissimilar test. It is not possible to say from this analysis that girls tend to exhibit more creativity than boys or whether it is a case of the test being biased for girls. At any rate, those using the test would do well to use separate norms for girls and boys.

Intelligence Level Differences. Tables 5 and 6 report data for pre and post tests sub-divided by I.Q. levels. Level 1 is defined as I.Q. of 90 (N=127) and below; Level 2 is defined as I.Q. of 91-119 (N=501) and Level 3 is I.Q. of 120+ (N=146). In all cases (pre and post) for all sub-tests and total score there were mean differences between levels of I.Q. significantly greater than the .01 level of confidence. In all cases the higher I.Q. level had a significantly higher mean creativity test score. This finding reflects the correlation of .61 for post-test total score and I.Q. as reported in Table 24. The test user will thus obviously also need to consider I.Q. level when interpreting the creativity test scores.

TABLE 2. PRE AND POST-TEST MEANS, STANDARD DEVIATIONS, MAXIMUM AND MINIMUM SCORES *

Variable	$\bar{X}$	SD	Max.	Min.
Redefinition	5.51	2.64	15	0
Flexibility	5.57	3.98	22	0
Originality-Clever	.72	1.51	12	0
Sensitivity	15.24	5.39	30	0
Originality-Remote	1.03	1.45	13	0
Fluency	8.33	4.18	29	0
Total-Pretest	36.59	13.56	88	4
Redefinition	7.06	3.04	15	0
Flexibility	8.85	4.58	23	0
Originality-Clever	1.45	2.11	14	0
Sensitivity	16.95	5.46	30	0
Originality-Remote	2.50	2.37	14	0
Fluency	11.05	4.94	27	0
Total-Post-test	47.90	16.74	93	3

* N = 898 Pre-test, 896 Post-test.

TABLE 3. PRE-TEST MEANS, STANDARD DEVIATIONS

MAXIMUM AND MINIMUM SCORES BY SEX

Variable	Sex	$\bar{X}$	SD	Max.	Min.	t
Redef.	M	5.66	2.84	15	0	2.57*
	F	5.36	2.42	13	0	
Flex.	M	5.74	3.89	22	0	.49
	F	5.81	4.06	22	0	
Orig.C.	M	.76	1.54	12	0	1.02
	F	.67	1.48	8	0	
Sensi.	M	14.55	5.25	29	0	8.48**
	F	15.96	5.44	30	0	
Orig.R.	M	.97	1.36	9	0	1.39
	F	1.09	1.53	13	0	
Flu.	M	7.75	4.01	22	0	7.93**
	F	8.91	4.28	29	0	
Total	M	35.52	13.38	88	4	8.21**
	F	37.69	13.67	83	4	

N = Males = 392; females = 382

* Significant at .05 level
** Significant at .01 level

TABLE 4. POST-TEST MEANS, STANDARD DEVIATIONS

MAXIMUM AND MINIMUM SCORES BY SEX

Variable	Sex	$\bar{X}$	SD	Max.	Min.	t
Redef.	M	7.36	3.03	15	0	4.88**
	F	6.75	3.01	15	0	
Flex.	M	8.99	4.35	21	0	1.82
	F	8.71	4.80	23	0	
Orig.C.	M	1.49	2.12	14	0	.86
	F	1.40	2.11	10	0	
Sensi.	M	16.40	5.34	29	0	6.75**
	F	17.53	5.52	30	0	
Orig.R.	M	2.38	2.29	12	0	2.17*
	F	2.62	2.44	14	0	
Flu.	M	10.49	4.86	27	0	7.10**
	F	11.62	4.95	27	0	
Total	M	47.09	16.47	93	4	5.58**
	F	48.73	17.00	93	3	

N = Males = 392; females = 382

* Significant at .05 level
** Significant at .01 level

TABLE 5. PRE-TEST MEANS, STANDARD DEVIATIONS

MAXIMUM AND MINIMUM SCORES BY IQ

Variable	IQ Level #	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{2,3}$	$t_{1,3}$
Redef.	1	3.92	2.11	10	0			
	2	5.47	2.46	15	0	10.09	10.61	16.40
	3	7.06	2.82	13	1			
Flex.	1	2.80	2.95	13	0			
	2	5.70	3.63	22	0	15.62	16.15	25.75
	3	8.62	3.92	22	0			
Orig.C.	1	.25	.76	4	0			
	2	.58	1.34	10	0	3.00	8.72	9.04
	3	1.59	2.13	12	0			
Sensi.	1	11.82	5.38	24	0			
	2	15.47	5.02	29	0	16.28	9.36	20.19
	3	17.45	5.20	30	1			
Orig.R.	1	.57	1.00	6	0			
	2	1.00	1.45	13	0	3.71	4.62	6.86
	3	1.53	1.62	9	0			
Flu.	1	5.43	3.75	18	0			
	2	8.48	3.98	29	0	15.48	9.78	20.59
	3	10.31	3.87	22	2			
Total	1	24.87	11.24	57	4			
	2	36.66	11.97	88	7	34.51	30.18	51.70
	3	46.53	12.51	80	16			

# IQ Levels: 1 = 90, N = 127
2 = 91-119, N = 501
3 = 120+, N = 146

P < .05 t = 1.96
P < .01 t = 2.58

TABLE 6 . POST-TEST MEANS, STANDARD DEVIATIONS

MAXIMUM AND MINIMUM SCORES BY IQ

Variable	IQ Level#	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{2,3}$	$t_{1,3}$
Redef.	1	5.17	2.42	12	0			
	2	6.91	2.82	15	0	10.58	14.60	20.31
	3	9.23	2.97	15	2			
Flex.	1	5.21	4.08	16	0			
	2	8.75	4.03	20	0	17.73	19.16	29.12
	3	12.38	4.15	23	3			
Orig.C.	1	.50	1.33	8	0			
	2	1.27	1.86	8	0	5.85	12.03	13.70
	3	2.89	2.71	14	0			
Sensi.	1	13.43	5.71	27	0			
	2	16.95	5.03	30	2	15.59	14.78	23.91
	3	20.05	4.77	30	7			
Orig.R.	1	1.13	1.43	8	0			
	2	2.39	2.26	12	0	8.77	11.73	17.05
	3	4.07	2.53	14	0			
Flu.	1	7.29	3.99	21	0			
	2	11.05	4.47	24	0	18.10	16.16	27.27
	3	14.30	4.92	27	4			
Total	1	32.73	14.11	79	3			
	2	47.35	13.92	91	14	39.39	44.29	65.51
	3	63.01	14.86	93	27			

#IQ Level: 1 = 90, N = 127
2 = 91-119, N = 501
3 = 120+, N = 146

P < .05 t = 1.96
P < .01 t = 2.58

Age Differences. Tables 7 and 8 report test data sub-divided by four levels of age. Level 1 was 10 years of age or less (N=57), Level 2 was age 11 (N=563), Level 3 was 12 years (N=115) and Level 4 was 13 years or more (N=39). As in the previous analysis, the means of each level were compared to determine if there were significant differences between levels. Although differences were not always significant, inspection of these tables reveals a direction of differences in keeping with the theory that as children become older they become less creative. In all cases the older levels had lower mean sub-test and total test scores than did the younger students. In some cases the 10 years or below group had significantly lower mean scores than did the 11 year old group but the age 10 and below group still had a higher mean score than the 12 and 13+ group. Caution, however, should be used in interpreting seeming differences between age levels. These differences may actually be due to differences in I.Q. level since age 13+ is rare for the normal sixth grade child one would expect such students to be the less intelligent repeaters. Also, since age 10 or below is low for grade six most of these students are undoubtedly from the two classes which were 5th-6th combination grades and the school location may be the relevant factor in this case.

Socio-economic Level Differences. The data was further analyzed by levels of socio-economic status as established by Warner's ranking of parental occupation (Tables 9 and 10). In this system a rank of 1 is high and 7 low. In this analysis levels 1 and 2 were combined as were levels 6 and 7 in order to obtain larger N's at these extremes. Thus the level 1 represents higher executives of large concerns, proprietors (larger stores), major professionals, business managers, and lesser professionals (N=86). Level 2 represents administrative personnel, owners of small businesses (e.g. beauty shop), farmers, and minor professionals (N=93). Level 3 represents clerical and sales workers, technicians, and owners of little businesses (e.g. newsstand) (N=104). Level 4 includes skilled manual employees and small farmers and tenant farmers (N=229). Level 5 includes machine operators, semi-skilled employees, and unskilled employees (N=262).

For total mean scores on both pre and post tests the differences between all levels were significant at the .01 level. The higher socio-economic levels had higher mean scores than the lower socio-economic levels. One would suspect this is indicative of a general bias of the written test and content of all items toward the upper socio-economic level student. Supporting this conclusion is the fact that the relationship of higher means for higher socio-economic levels was consistent for all items for the test battery, thus ruling out the possible inappropriateness of particular items. It is also noted that socio-economic status correlated at .33 with I.Q. for the total population (N=778) and only .22 and .28 with the pre and post test total creativity scores. Knowing the relationship of socio-economic status to non-culture free tests of intelligence such as those used in this study, would lead one to conclude that seeming relationships of socio-economic status to creativity were the function of the relationship of socio-economic status to I.Q. Indeed, the partial correlation of status to post-test creativity when I.Q. is held constant is reduced to .11.* This is a net variance reduction of 6.6 percent. However, the user of

* Partial correlation estimated using a nomograph.

TABLE 7. PRE-TEST MEANS, STANDARD DEVIATIONS, MAXIMUM AND MINIMUM SCORES BY AGE

Variable	Age	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{2,3}$	$t_{2,4}$	$t_{3,4}$
Redef.	1 - 10	4.63	1.91	9	1	5.33**	.80	1.19	5.98**	5.74**	1.89
	2 11	5.83	2.69	15	0						
	3 12	4.83	2.57	11	0						
	4 13+	4.28	2.18	9	1						
Flex.	1 - 10	5.12	3.85	17	0	4.67**	3.87**	5.59**	12.28**	10.59**	2.95**
	2 11	6.41	3.96	22	0						
	3 12	3.94	3.38	12	0						
	4 13+	2.95	2.95	10	0						
Orig.C.	1 - 10	.18	.68	4	0	4.01**	1.27	.18	4.01**	3.20**	.93
	2 11	.88	1.67	12	0						
	3 12	.37	.94	4	0						
	4 13	.21	.61	2	0						
Sensi.	1 - 10	14.77	4.70	25	1	4.18**	4.30**	10.28**	12.46**	16.20**	7.36**
	2 11	16.08	5.12	30	0						
	3 12	13.18	5.45	26	2						
	4 13+	10.00	5.41	21	0						
Orig.R.	1 - 10	.60	1.08	5	0	3.19**	1.90	.88	1.37	3.62**	2.51*
	2 11	1.13	1.47	13	0						
	3 12	.96	1.50	9	0						
	4 13+	.41	1.09	6	0						

TABLE 7. CONTINUED

Variable	Age	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{2,3}$	$t_{2,4}$	$t_{3,4}$
Flu.	1 - 10	7.46	3.63	16	1						
	2 11	9.03	4.03	29	0						
	3 12	6.67	3.99	19	0	5.65**	2.48*	7.98**	11.50**	14.37**	6.54**
	4 13+	4.26	3.86	18	0						
Total	1 - 10	32.74	9.81	55	10						
	2 11	39.34	13.05	88	7						
	3 12	29.96	12.41	65	4	13.29**	5.05**	15.75**	25.48**	28.92**	12.13**
	4 13+	22.10	11.67	49	4						

N: 1=57; 2=563; 3=115; 4=39

* Significant at .05 level
** Significant at .01 level

TABLE 8. POST-TEST MEANS, STANDARD DEVIATIONS, MAXIMUM AND MINIMUM SCORES BY AGE

Variable	Age	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{2,3}$	$t_{2,4}$	$t_{3,4}$
Redef.	1 - 10	5.79	2.44	12	1	7.32**	.69	2.13*	8.93**	8.53**	2.90**
	2 11	7.55	3.05	15	0						
	3 12	5.97	2.69	14	0						
	4 13+	5.10	2.40	11	1						
Flex.	1 - 10	8.12	4.05	19	0	5.31**	5.03**	7.09**	14.93**	13.03**	3.55**
	2 11	9.67	4.44	23	0						
	3 12	6.47	4.13	17	0						
	4 13+	5.13	4.22	14	0						
Orig.C.	1 - 10	.98	1.47	6	0	3.46**	.78	2.22*	5.80**	5.04**	1.59
	2 11	1.69	2.25	14	0						
	3 12	.82	1.67	6	0						
	4 13+	.46	.97	4	0						
Sensi.	1 - 10	16.54	4.58	27	7	4.16**	5.80**	9.52**	14.59**	15.39**	5.68**
	2 11	17.85	5.20	30	2						
	3 12	14.45	5.13	26	2						
	4 13+	12.00	6.27	24	0						
Orig.R.	1 - 10	2.37	2.26	10	0	2.09*	3.24**	6.03**	7.77**	8.26**	3.48**
	2 11	2.82	2.41	14	0						
	3 12	1.60	2.09	12	0						
	4 13+	.74	.85	3	0						

TABLE 8. CONTINUED

Variable	Age	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{2,3}$	$t_{2,4}$	$t_{3,4}$
Flu.	1 - 10	11.58	4.22	22	3						
	2 11	11.91	4.80	27	2	1.09	9.30**	15.33**	15.55**	17.93**	8.01**
	3 12	8.45	4.36	23	0						
	4 13+	5.49	2.82	10	0						
Total	1 - 10	45.35	13.53	82	22						
	2 11	51.55	15.86	93	14	11.18**	12.48**	21.32**	34.12**	34.44**	12.58**
	3 12	37.75	14.43	79	6						
	4 13+	28.92	14.09	58	3						

N: 1=57; 2=563; 3=115; 4=39

* Significant at .05 level
** Significant at .01 level

TABLE 9. PRE-TEST MEANS, STANDARD DEVIATIONS, MAXIMUM AND MINIMUM SCORES BY LEVELS OF SOCIO-ECONOMIC STATUS #

Test	Level	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{1,5}$	$t_{2,3}$	$t_{2,4}$	$t_{2,5}$	$t_{3,4}$	$t_{3,5}$	$t_{4,5}$
Redef.	1	6.33	2.81	13	1										
	2	6.14	2.46	14	1										
	3	5.86	2.81	15	0	.78	1.92	4.51**	6.73**	1.21*	3.77**	6.04**	2.41*	4.65**	2.70**
	4	5.39	2.68	13	0										
	5	5.00	2.44	12	0										
Flex.	1	7.44	3.85	22	0										
	2	6.11	3.59	15	0										
	3	6.60	4.10	20	0	4.61**	2.89**	7.42**	10.17**	1.75	2.26*	4.88**	4.35**	7.13**	3.29**
	4	5.56	4.07	21	0										
	5	4.97	3.81	22	0										
Orig.C.	1	1.12	1.52	6	0										
	2	.62	1.32	6	0										
	3	.83	1.59	8	0	2.81**	1.59	2.41*	3.81**	1.22	.71	.43	.66	1.95	1.53
	4	.73	1.68	10	0										
	5	.56	1.36	12	0										
Sensi.	1	16.34	5.27	28	1										
	2	16.26	4.41	29	5										
	3	15.72	5.41	28	1	.24	1.84	3.52**	7.14**	1.70	3.42**	7.22**	1.54	5.33**	4.71**
	4	15.29	5.67	30	0										
	5	14.29	5.35	28	2										
Orig.R.	1	1.22	1.48	7	0										
	2	1.17	1.41	6	0										
	3	1.22	1.60	9	0	.28	.00	1.83	2.04*	.29	1.56	1.76	1.94	2.16*	.19
	4	.94	1.45	13	0										
	5	.92	1.37	9	0										

TABLE 9. CONTINUED

Test	Level	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{1,5}$	$t_{2,3}$	$t_{2,4}$	$t_{2,5}$	$t_{3,4}$	$t_{3,5}$	$t_{4,5}$
Flu.	1	9.86	4.36	19	2										
	2	9.98	3.99	22	1										
	3	8.70	3.86	20	1	.39	3.94**	7.86**	9.23**	4.53**	8.67**	10.11**	3.69**	5.05**	1.58
	4	7.82	4.15	29	0										
	5	7.53	4.05	22	0										
Total	1	42.30	13.11	76	18										
	2	40.31	11.44	68	12										
	3	38.88	13.43	80	10	3.80**	6.43**	14.42**	19.80**	2.84*	10.67**	16.09**	7.63**	13.01**	6.32**
	4	35.52	14.09	83	4										
	5	33.42	13.00	88	4										

N= SE level: 1=86; 2=93; 3=104; 4=229; 5=262

#Socio-economic status determined using Warner's Scale. 1 is high and 5 is low.

* Significant at .05 level
** Significant at .01 level

TABLE 10. POST-TEST MEANS, STANDARD DEVIATIONS, MAXIMUM AND MINIMUM SCORES BY LEVELS OF SOCIO-ECONOMIC STATUS#

Test	Level	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{1,5}$	$t_{2,3}$	$t_{2,4}$	$t_{2,5}$	$t_{3,4}$	$t_{3,5}$	$t_{4,5}$
Redef.	1	7.88	3.24	14	1										
	2	7.60	3.21	15	2										
	3	7.34	2.86	14	0	1.04	2.13*	3.68**	6.54**	1.05	2.51*	5.37**	1.40	4.33**	3.54**
	4	7.05	3.15	15	1										
	5	6.50	2.77	15	0										
Flex.	1	11.81	4.48	21	2										
	2	9.80	4.42	23	0										
	3	9.62	4.65	21	0	6.37**	7.03**	12.33**	16.60**	.59	4.80**	9.17**	4.22**	8.75**	5.86**
	4	8.58	4.22	19	0										
	5	7.48	4.38	20	0										
Orig.C.	1	2.00	2.08	8	0										
	2	1.89	2.13	10	0										
	3	1.71	2.17	10	0	.51	1.36	3.26**	5.36**	.86	2.73**	4.86**	1.79	3.97**	2.69**
	4	1.40	2.13	8	0										
	5	1.05	2.02	14	0										
Sensi.	1	18.37	4.74	30	4										
	2	18.56	4.93	30	6										
	3	17.54	4.82	26	5	.58	2.60*	5.77**	8.39**	3.24**	6.58*	9.28**	3.18**	5.92**	3.29**
	4	16.66	5.76	30	0										
	5	15.95	5.60	30	0										
Orig.R.	1	3.29	2.21	11	0										
	2	3.18	2.55	12	0										
	3	3.00	2.82	14	0	.48	1.25*	5.17**	7.47**	.77	4.64*	6.90**	3.78**	5.99**	2.41*
	4	2.29	2.39	11	0										
	5	1.97	1.96	9	0										

TABLE 10. CONTINUED

Test	Level	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{1,5}$	$t_{2,3}$	$t_{2,4}$	$t_{2,5}$	$t_{3,4}$	$t_{3,5}$	$t_{4,5}$
Flu.	1	13.03	4.70	23	5										
	2	12.73	4.67	23	3										
	3	11.54	5.26	26	1	.93	4.57**	8.24**	11.80**	3.74**	7.38**	10.99**	3.08**	6.53**	4.21**
	4	10.72	5.00	27	0										
	5	9.89	4.55	23	0										
Total	1	56.27	15.23	89	24										
	2	54.34	16.06	91	16										
	3	50.87	16.37	93	23	3.26**	9.30**	18.75**	27.61**	6.04**	15.31**	24.20**	8.69**	17.60**	10.79**
	4	46.68	16.77	93	3										
	5	42.76	15.59	90	4										

N= SE level: 1=86; 2=93; 3=104; 4=229; 5=262

#Socio-economic status determined using Warner's Scale. 1 is high and 5 is low.

* Significant at .05 level
** Significant at .01 level

TABLE 11. STANDARD SCORES AND CENTILES FOR TOTALS

PRE-POST TESTS

Raw Score	Pre-test Standard Scores	Centile	Post-tests Standard Scores	Centile
1	23.754	.001	21.984	.001
2	24.492	.001	22.581	.001
3	25.229	.001	23.178	.001
4	25.966	.002	23.775	.002
5	26.704	.004	24.373	.004
6	27.441	.007	24.970	.006
7	28.178	.009	25.568	.006
8	28.916	.014	26.165	.007
9	29.653	.019	26.762	.008
10	30.391	.021	27.360	.008
11	31.128	.022	27.957	.009
12	31.866	.023	28.554	.011
13	32.603	.029	29.152	.013
14	33.341	.039	29.749	.017
15	34.078	.048	30.346	.020
16	34.816	.056	30.944	.024
17	35.553	.062	31.541	.029
18	36.291	.072	32.139	.031
19	37.028	.088	32.736	.034
20	37.765	.105	33.333	.038
21	38.503	.125	33.931	.045
22	39.240	.147	34.528	.054
23	39.978	.168	35.125	.064

TOTALS (continued)

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
24	40.715	.192	35.723	.075
25	41.453	.215	36.320	.091
26	42.190	.234	36.918	.102
27	42.928	.257	37.515	.109
28	43.665	.283	38.112	.120
29	44.403	.311	38.710	.134
30	45.140	.338	39.307	.152
31	45.878	.362	39.904	.167
32	46.615	.389	40.502	.180
33	47.353	.424	41.099	.192
34	48.090	.463	41.697	.206
35	48.827	.494	42.294	.222
36	49.565	.524	42.891	.244
37	50.302	.562	43.489	.269
38	51.040	.594	44.086	.288
39	51.777	.615	44.683	.311
40	52.515	.636	45.281	.334
41	53.252	.657	45.878	.358
42	53.990	.679	46.476	.386
43	54.727	.705	47.073	.410
44	55.465	.726	47.670	.433
45	56.202	.749	48.268	.461
46	56.940	.774	48.865	.486

TOTALS (continued)

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
47	57.677	.795	49.462	.507
48	58.414	.812	50.060	.533
49	59.152	.823	50.657	.562
50	59.889	.846	51.254	.585
51	60.627	.862	51.852	.603
52	61.364	.876	52.449	.626
53	62.102	.888	53.047	.651
54	62.839	.901	53.644	.670
55	63.577	.912	54.241	.688
56	64.314	.921	54.839	.709
57	65.052	.928	55.436	.729
58	65.789	.936	56.033	.751
59	66.527	.946	56.631	.767
60	67.264	.953	57.228	.780
61	68.001	.959	57.826	.795
62	68.739	.966	58.423	.809
63	69.476	.968	59.020	.821
64	70.214	.971	59.618	.834
65	70.951	.976	60.215	.848
66	71.689	.983	60.812	.859
67	72.426	.988	61.410	.871
68	73.164	.989	62.007	.883
69	73.901	.990	62.605	.891

TOTALS (continued)

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
70	74.639	.991	63.202	.900
71	75.376	.991	63.799	.913
72	76.114	.992	64.397	.923
73	76.851	.992	64.994	.929
74	77.588	.993	65.591	.935
75	78.326	.994	66.189	.940
76	79.063	.995	66.786	.946
77	79.801	.996	67.384	.952
78	80.538	.996	67.981	.956
79	81.276	.996	68.578	.960
80	82.013	.997	69.176	.965
81	82.751	.997	69.773	.967
82	83.488	.997	70.370	.970
83	84.226	.998	70.968	.974
84	84.963	.998	71.565	.977
85	85.701	.998	72.162	.980
86	86.438	.998	72.760	.983
87	87.176	.998	73.357	.985
88	87.913	.999	73.955	.987
89	88.650	.999	74.552	.989
90	89.387	.999	75.149	.991
91	90.125	.999	75.747	.994
92	90.862	.999	76.344	.997
93	91.600	.999	76.941	.999

TABLE 12. STANDARD SCORES AND CENTILES FOR FLUENCY

PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
1	32.464	.025	29.656	.009
2	34.856	.054	31.680	.016
3	37.249	.096	33.704	.034
4	39.641	.154	35.729	.064
5	42.033	.225	37.753	.099
6	44.426	.308	39.777	.151
7	46.818	.414	41.802	.219
8	49.211	.519	43.826	.292
9	51.603	.607	45.850	.359
10	53.995	.692	47.874	.452
11	56.388	.766	49.899	.538
12	58.780	.823	51.923	.615
13	61.172	.862	53.947	.680
14	63.565	.900	55.972	.743
15	65.957	.934	57.996	.797
16	68.349	.958	60.020	.838
17	70.742	.972	62.045	.873
18	73.134	.983	64.069	.904
19	75.526	.991	66.093	.927
20	77.919	.994	68.117	.947
21	80.311	.995	70.142	.967
22	82.703	.997	72.166	.980
23	85.096	.997	74.190	.988
24	87.488	.997	76.215	.992
25	89.880	.997	78.239	.994

FLUENCY (continued)

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
26	92.273	.998	80.263	.996
27	94.665	.998	82.287	.999
28	97.057	.998	84.311	.999
29	99.450	.999	86.336	.999

TABLE 13. STANDARD SCORES AND CENTILES FOR FLEXIBILITY PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
1	38.518	.136	32.860	.047
2	41.030	.212	35.044	.077
3	43.543	.291	37.227	.112
4	46.055	.377	39.410	.158
5	48.568	.463	41.594	.216
6	51.080	.555	43.777	.290
7	53.593	.655	45.961	.377
8	56.106	.737	48.144	.460
9	58.618	.804	50.327	.532
10	61.131	.864	52.511	.613
11	63.643	.910	54.694	.702
12	66.156	.939	56.878	.774
13	68.668	.958	59.061	.829
14	71.181	.972	61.245	.866
15	73.693	.981	63.428	.899
16	76.206	.988	65.611	.931
17	78.719	.993	67.795	.957
18	81.231	.994	69.978	.974
19	83.744	.995	72.162	.984
20	86.256	.996	74.345	.992
21	88.769	.997	76.528	.997
22	91.281	.999	78.712	.998
23	93.794	.999	80.895	.999

TABLE 14. STANDARD SCORES AND CENTILES FOR REDEFINITION PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
1	32.917	.031	30.066	.009
2	36.705	.093	33.355	.029
3	40.492	.193	36.645	.078
4	44.280	.318	39.934	.170
5	48.068	.458	43.224	.298
6	51.856	.604	46.513	.438
7	55.644	.741	49.803	.565
8	59.432	.839	53.092	.675
9	63.220	.899	56.382	.767
10	67.008	.938	59.671	.844
11	70.795	.963	62.961	.900
12	74.583	.982	66.250	.936
13	78.371	.993	69.539	.966
14	82.159	.997	72.829	.988
15	85.947	.999	76.118	.997

TABLE 15. STANDARD SCORES AND CENTILES FOR ORIGINALITY-CLEVER PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
2	58.477	.847	52.607	.696
4	71.722	.952	62.085	.863
6	84.967	.986	71.564	.948
8	98.212	.994	81.043	.987
10	111.457	.998	90.521	.998
12	124.702	.999	100.000	.998
14	137.947	.999	109.479	.999

TABLE 16. STANDARD SCORES AND CENTILES FOR ORIGINALITY-REMOTE PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
1	49.793	.608	43.671	.324
2	56.690	.813	47.890	.511
3	63.586	.911	52.110	.659
4	70.483	.954	56.329	.780
5	77.379	.978	60.549	.865
6	84.276	.988	64.768	.918
7	91.172	.993	68.987	.945
8	98.069	.995	73.207	.961
9	104.966	.997	77.426	.981
10	111.862	.997	81.646	.990
11	118.759	.998	85.865	.994
12	125.655	.998	90.084	.998
13	132.552	.999	94.304	.998
14	139.440	.999	98.523	.999

TABLE 17. STANDARD SCORES AND CENTILES FOR SENSITIVITY PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
1	23.581	.007	20.788	.006
2	25.436	.011	22.619	.008
3	27.291	.018	24.451	.011
4	29.147	.026	26.282	.016
5	31.002	.031	28.114	.022
6	32.857	.046	29.945	.030
7	34.712	.064	31.777	.038
8	36.568	.085	33.608	.049
9	38.423	.122	35.440	.073
10	40.278	.172	37.271	.104
11	42.134	.228	39.103	.140
12	43.989	.290	40.934	.184
13	45.844	.358	42.766	.236
14	47.699	.424	44.597	.299
15	49.555	.488	46.429	.375
16	51.410	.559	48.260	.449
17	53.265	.630	50.092	.513
18	55.121	.696	51.923	.574
19	56.976	.757	53.755	.631
20	58.831	.812	55.586	.690
21	60.686	.853	57.418	.746
22	62.542	.891	59.249	.794
23	64.397	.924	61.081	.84[illegible]

SENSITIVITY (continued)

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
24	66.252	.950	62.912	.893
25	68.108	.967	64.744	.930
26	69.963	.979	66.575	.955
27	71.818	.988	68.407	.975
28	73.673	.994	70.238	.986
29	75.529	.998	72.070	.991
30	77.384	.999	73.901	.997

these tests would do well to consider socio-economic status of his students when using the norm data.

Standard Scores and Centiles. Tables 11 through 17 present standard scores and centiles for each sub-test and total score computed from the pre and post test.

Frequency Scoring of the Consequences Test

The Two Methods Compared. The correlation of the remote-judgment method of scoring the Consequences Tests with the frequency of response method was .436 (N=755). This correlation is surprisingly low for a supposedly alternate method of measuring an entity known as "originality". However, the degree of correlation has undoubtedly been attenuated by imperfect reliability of each procedure (Guilford, 1965, p. 486). Table 18 presents the intercorrelations of the tests scored using the frequency procedure. Table 23 shows the intercorrelations of all test items for a random sample of 124 post-tests. The average intercorrelation of items 1 and 2 and items 3 and 4 of the Consequences Test scored using the frequency method is .366. The intercorrelations of these items using the remote method is .433. This would indicate comparable items in spite of the method of scoring used.

A distinct advantage of the frequency of response method of scoring the Consequences Test for Originality is the increased objectivity. There are only minimal judgments necessary such as deciding if different wording implies different meaning or is equivalent to another response. No judgments of the remoteness or obviousness of a response are called for. Thus, another interesting interpretation of the low correlation of these two scoring methods is that the remoteness score may be more of a measure of the frequency of a response in the experience of the scorer population rather than the frequency in the population of subjects taking the test.

Appendix A of this report contains a listing of all responses for each item and their frequency. The researcher interested in comparing responses for other populations may find this valuable.

Table 19 presents the mean scores and standard deviations for each item using the frequency method.

Differences in response by Sex, I.Q., and Socio-economic Status. Responses made by ten or more persons (less original responses) were examined to see if significant differences in types of response were evident between the sexes, I.Q. level, and between levels of socio-economic status. Only responses occuring ten or more times and differing significantly ($p < .05$) in frequencies between levels using the Chi-square test of difference were examined. Tables 20, 21 and 22 contain these significantly different responses and related Chi-square values. The four questions for each of the items were as follows:

1. What would be the results if none of us needed food any more in order to live?

2. What would be the results if the entire United States west of the Mississippi became a dry desert?

TABLE 18. INTERCORRELATION OF CONSEQUENCES TEST ITEMS WHEN SCORED USING FREQUENCY PROCEDURE (N=898).

Question	1	2	3	4
1		.375	.414	.381
2			.335	.335
3				.386

TABLE 19. MEANS AND STANDARD DEVIATIONS OF SCORES OBTAINED USING THE FREQUENCY METHOD FOR CONSEQUENCES TEST ITEMS (N = 898).

Item	X	SD
1	2109.8	1468.4
2	1901.3	1253.4
3	1674.7	1214.9
4	1384.6	1178.1
Total	7150.20	3721.75 (N=775)

3. What would be the results if everyone suddenly lost the sense of balance and were unable to stay up more than a moment?

4. What would be the results if everyone suddenly lost the ability to read and write?

The first digit of the code number in Tables 20 through 22 is the question number. The next digits identify category grouping and specific response. It will be noted in examining these responses that most could be logically linked to sex interests (Table 20). For example many items significantly more frequent for females dealt with cooking and household activities where those significantly more frequent for males dealt with sports or animals. Since these responses are less creative (less original as defined) the sex linkage of conforming responses found by Torrance (1962, pp. 111-114) appears to be substantiated here.

Examination of the differences in responses between I.Q. levels (Table 21) does not result in as clear a relationship as those between the sexes. However, if one examines the differences between observed and expected frequencies contributing to the Chi-square, it appears that where the high I.Q. level (120+) made more frequent than expected responses, the responses tend to be more esoteric possibly requiring more abstract thinking to arrive at a less obvious relationship. The correlation of I.Q. and total creativity of .61 and of the originality-remote scores and I.Q. of .31 (average of pre and post test correlation) further support this interpretation when it is realized that the responses analyzed here are the less original (since they are more frequent) and therefore should be expected to be even more highly related to I.Q. consistent with the theory which assumes I.Q. and creative response to be more highly related in ranges of I.Q. below 120 than above.

It might be concluded, therefore, that to the extent originality scores are based on responses requiring more abstract thinking, the higher I.Q. students will produce a higher frequency of such responses and will obtain higher creativity scores. But when infrequency of response is important in obtaining a score we might expect a drop in the correlation of I.Q. and creativity. Since the frequency scoring method makes no judgment of cleverness or abstractness one would expect to find a lower correlation of I.Q. with originality with this method than with the remote judgment method. This is exactly what was found. The correlation of I.Q. to originality (frequency method) was only .09 (N=342) as compared to r = .41 (N=778) using the originality-remote method for post-test scores.

Only three responses were significantly different between levels of socio-economic status (see Table 22). No interpretation was attempted.

An examination of unique responses was made to see if significant relationships could be determined. Unique in this case referred to single responses in the total population. No relationships were discernible. This would appear to support the conclusion that the factors of sex and I.Q. level discussed above for non-unique responses (responses made by 10 or more persons) are conforming factors related to non-creative

TABLE 20. SIGNIFICANT DIFFERENCES BETWEEN ORIGINALITY RESPONSES FOR SEX

Code	Males	Females	Total	x^2	Responses
11030	14(25.5)	35(23.5)	49	10.813	No Doing Dishes
11033	11(19.8)	27(18.2)	38	8.166	No Need to Cook
11036	2(8.8)	15(8.2)	17	9.350	Save Going to the Store
11207	1(6.2)	11(5.8)	12	7.37	Loss of Jobs
11302	56(68.6)	76(63.4)	132	4.818	No Food Markets
11409	23(17.2)	10(15.8)	33	4.084	Save Time
11411	2(6.2)	10(5.8)	12	4.568	Could Do More Things
11501	58(71.8)	80(66.2)	138	5.529	People Have More Money
11701	17(23.9)	29(22.1)	46	4.146	No More Dishes
11706	70(86.8)	97(80.2)	167	6.770	No Stores
11708	6(13.0)	19(12.0)	25	7.852	No Cabinets
11031	18(13.00)	7(12.00)	25	4.006	No Meals
20504	40(32.2)	22(29.8)	62	3.931	No Specific Animals
20505	11(18.2)	24(16.8)	35	5.934	Be Very Hot
20512	90(109.2)	120(100.8)	210	7.032	Plants Would Die
20517	9(15.6)	21(14.4)	30	5.817	No Rain in West
20522	13(20.8)	27(19.2)	40	6.093	Die From Lack of Water
20523	2(6.2)	10(5.8)	12	4.568	No Schools There
20603	9(15.1)	20(13.9)	29	5.141	Couldn't Stay Clean
20606	4(10.9)	17(10.1)	21	9.081	No Swimming
20507	19(13.00)	6(12.00)	25	5.679	No Towns in West
30705	41(56.16)	67(51.84)	108	8.525	Peoole Fall and Get Hurt
30706	5(12.48)	19(11.52)	24	9.340	Bump Into Each Other
30705	77(63.44)	45(58.56)	122	6.038	Everyone Crawl
31114	3(7.28)	11(6.72)	14	4.088	People Go Crazy
31306	33(23.40)	12(21.60)	45	8.205	No Sports
31307	7(11.96)	16(11.04)	23	4.285	More Sitting Down

df=1 P .05 = 3.841
P .01 = 6.635

TABLE 21. SIGNIFICANT DIFFERENCES BETWEEN ORIGINALITY RESPONSES BY IQ LEVEL.

Code	IQ -90	IQ 91-119	IQ 120+	Total	x^2	Responses
11302	11(19.68)	80(79.95)	32(23.37)	123	7.015	No Food Markets
11501	10(19.68)	82(79.95)	31(23.37)	123	7.304	People Have More Money
11908	22(12.48)	50(50.70)	6(14.82)	78	12.520	No Specific Foods
11033	3(5.28)	16(21.45)	14(6.27)	33	10.321	No Need to Cook
11201	2(6.72)	25(27.30)	15(7.98)	42	8.170	No Restaurants
11706	9(24.64)	102(100.10)	43(29.26)	154	16.415	No Stoves
11917	3(1.76)	15(7.13)	1(2.09)	19	8.033	No Farm Animals
20502	16(29.60)	128(120.25)	41(35.15)	185	7.721	Animals Would Die
20503	11(7.36)	34(29.90)	1(8.74)	46	7.899	People Would Move
20510	13(5.44)	18(22.10)	3(6.46)	34	11.279	No Houses in West
20805	3(16.48)	50(66.95)	50(19.57)	103	62.633	Overpopulated in East
30705	17(15.36)	52(62.40)	27(18.24)	96	6.115	People Fall and Get Hurt
30514	2(5.76)	21(23.40)	13(6.84)	36	6.774	No Acrobats
30805	2(10.72)	43(43.55)	22(12.73)	67	13.850	Couldn't Ride Bikes
31206	1(3.84)	23(15.60)	10(4.56)	34	10.287	More Wheel Chairs
41104	23(34.24)	156(139.10)	35(40.66)	214	6.530	No Books
40901	2(8.32)	29(33.80)	21(9.88)	52	16.168	More Radios

df=2 P .05 $\geq$ 5.991

P .01 $\geq$ 9.210

TABLE 22. SIGNIFICANT DIFFERENCES BETWEEN ORIGINALITY RESPONSES BY SE STATUS LEVELS

Code	Levels 1&2	Level 3	Level 4	Level 5	Level 6	Level 7	Total	x^2	Responses
20805	26(12.76)	18(13.92)	16(15.08)	32(33.64)	20(30.16)	4(10.44)	116	22.465	Overpopulated in East
20522	4(4.40)	4(4.80)	11(5.20)	5(11.60)	13(10.40)	3(3.60)	40	11.144	Die From Lack of Water
40901	13(6.05)	5(6.60)	10(7.15)	14(15.95)	10(14.30)	3(4.95)	55	11.807	More Radios

df=6 P .05 12.592
P .01 16.812

response and, therefore, the very reason no relationships could be discerned in the unique responses was because they were unique and essentially unrelated to sex or I.Q.

Reliability

Internal consistency. Internal consistency was estimated by examining the intercorrelation of items and correlation with total test score. This data is presented in Tables 23 and 24. The reader should be cautioned again about the skewed distributions for the Originality test when interpreting this data.

The data in Table 23 was derived from a random sample of individual's post-test scores (N=124). It will be observed that the correlations of items with like items is generally higher than correlations of unlike items. One exception are the Alternate Uses test items which correlate with each other at .575 and with two items of the Consequences test at .659 and .410. One explanation of this might be considered an indication of the validity of the items. Since flexibility (measured by the Alternate Uses test) is defined as the number of sets of responses and is related to fluency (measured by the Consequences test), this correlation could be expected theoretically. As one is more fluent with ideas the likelihood of more sets of ideas increases. In fact, in some types of tests (e.g. Guilford's Brick Test) both factors are scored from the same test.

In like manner the sensitivity test items (Seeing Problems Test) correlated at a somewhat higher than expected level with the Consequences Test items (fluency). Here again the relationship seems to support the item validity in that sensitivity to problems is considered a prerequisite to ideational fluency. The very high correlation of items 9 and 11 (.799) and 10 to 12 (.888) are due to the fact that these are the same items scored for two different factors (fluency and originality-remote). Such high correlations would suggest contamination of the two scoring procedures. It is also evidence of the lack of independence of the two scores since both obvious and remote responses yield a fluency score and the remote responses alone yield an originality score. This procedure is different from Guilford's in which only the obvious responses yielded a fluency score. However, it was the rationale of this investigation that the remote as well obvious scores should be considered an indication of ideational fluency.

Part-Total Relationships. Turning to Table 24 one can find the intercorrelations of sub-tests and the correlations of sub-tests with total scores for both pre and post testing. It will be noted that the low positive correlations are similar to expectations and those obtained by Guilford in numerous studies.

Test-Retest Reliability. Also, from Table 24, it will be observed that the test-retest reliability is within acceptable limits ranging from .314 for originality-remote to .755 for total.

Split-half Reliability. The item intercorrelations (Table 23) were used to compute Spearman-Brown split-half reliability coefficients. These are presented in Table 25. Reliabilities ranged from .326 for the originality-

TABLE 23. INTERCORRELATIONS OF TEST ITEMS FOR A RANDOM SAMPLE OF POST-TESTS (N=124)

Items*	1	2	3	4	5	6	7	8	9	10	11	12
1		.460	.157	.350	.242	.076	.104	.112	.117	.084	.037	.065
2			.139	.210	.089	.176	.023	.050	.062	.095	.042	.023
3				.575	.403	.210	.370	.373	.659	.432	.426	.301
4					.301	.198	.228	.206	.410	.282	.198	.158
5						.195	.273	.203	.392	.264	.119	.160
6							.122	.212	.176	.122	.201	.116
7								.593	.437	.417	.371	.343
8									.482	.422	.446	.376
9										.581	.799	.430
10											.478	.888
11												.433
12												

Key* 1,2 Halves of Redefinition test (alternate items) (redefinition)
3,4 Items of Alternate Uses (flexibility)
5,6 Items of Plot-Titles (Orig. -C)
7,8 Items of Seeing Problems (sensitivity)
9,10 Items (2 each) of Consequence test (fluency)
11,12 Items (2 each) of Consequence test (Orig. -R)

TABLE 24. INTERCORRELATION OF ALL MEASURES (N = 778).

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 IQ		.338	.280	.112	.404	.493	.289	.339	.210	.398	.535	.443	.530	.381	.406	.414	.489	.611
2 Socio.			.168	.041	.169	.199	.095	.128	.073	.206	.222	.152	.303	.166	.168	.208	.226	.288
3 Nom. **				.062	.171	.204	.196	.111	.198	.179	.241	.202	.242	.213	.145	.240	.261	.286
4 Act.					.067	.099	.090	.180	.080	.128	.164	.109	.126	.044	.230	.156	.181	.211
5 Redef.(Pre)						.399	.249	.211	.181	.271	.522	.564	.356	.247	.254	.281	.315	.445
6 Flex. (Pre)							.399	.449	.269	.456	.761	.425	.675	.407	.410	.434	.497	.652
7 Orig.-C (Pre)								.184	.251	.226	.439	.257	.281	.492	.162	.283	.254	.351
8 Sensi. (Pre)									.259	.496	.776	.214	.410	.200	.558	.347	.449	.541
9 Orig.-R (Pre)										.551	.520	.201	.265	.226	.254	.314	.304	.352
10 Flu. (Pre)											.778	.306	.486	.275	.474	.427	.604	.615
11 Total (Pre)												.454	.638	.404	.579	.517	.635	.755
12 Redef.(Post)													.449	.331	.279	.292	.348	.576
13 Flex. (Post)														.398	.487	.509	.586	.804
14 Orig.-C (Post)															.257	.340	.341	.526
15 Sensi.(Post)																.395	.572	.767
16 Orig.-R (Post)																	.663	.706
17 Flu. (Post)																		.842
18 Total (Post)																		

** N = 566

For 500 df two-tailed test
P .05 = .088
P .01 = .115

clever score to .744 for the sensitivity score. Total test-retest reliability was .734. As it was suspected that the high correlations of items 9 and 11 and 10 and 12 (see Table 23) were creating a particularly high split-half correlation for the total battery, this was recomputed omitting these items. When 9 and 10 were omitted the r_{tt} was .728. When 11 and 12 were omitted r_{tt} was .747. Both of these coefficients are quite similar to that obtained when these items were retained.

Inter-scorer Agreement. Since the tests were scored subjectively by trained persons using detailed guidelines, the extent of the inter-scorer agreement is also a relevant source of reliability data. Table 26 reports coefficients of agreement between scorers for each test for a random sample of three classrooms. It will be noted that correlations ranged from .67 to .99, the lowest being the plot-titles test requiring a judgment of the cleverness of titles. The Gestalt transformation test (redefinition) was scored objectively and does not appear in this table.

Concurrent Validity

Concurrent validity was estimated by correlating items with measures of Peer Nomination and an Interest and Activity Inventory.

It will be noted from examination of Tables 24 and 27 that generally low but positively and statistically significant coefficients were obtained when creativity measures were correlated with Peer Nomination and Interest Activity scores. Such a degree of correlation would indicate some validity for the creativity measures. However, the degree of validity and reliability held by the criterion measures themselves is of great importance (Guilford 1965 p. 488). Unfortunately, this data for the criterion measures was not available and a correction for attenuation not possible. However, it is reasonable to assume from the literature (Taylor, 1964) that reliability and validity of these measures is low and that estimates of creativity test 'validity' obtained would only be higher should the reliability and validity be raised. Furthermore, these low criterion correlations can be tolerated when the intercorrelations are low and there are a number of sub-tests in the battery (Guilford, 1965, p. 408).

Little difference between items was noted in their relationship to the criterion variables. Furthermore it would appear that I.Q. and the criterion variables were not closely related with correlations of .280 and .112 for I.Q. correlated with Peer Nomination and Activity Inventory. However, the total test and the items appear to correlate more with the I.Q. scores than with the criterion variables. This may be due to the greater reliability of the I.Q. test. Also as Wallach and Kogan have indicated, the fact that it is a test situation may cause correlations of I.Q. and creativity to be higher than that obtained in a more play-like situation (1965, p. 292).

A random sample of 107 cases was sub-divided by levels of I.Q., Sex, and Socio-economic status and the correlations of total battery score with the criterion variables examined (Table 28). Although the N in some of these groups is very low the variation in correlation is of interest. For example, it will be noted that at the higher socio-economic status levels the correlation of creativity to I.Q. increases. This is exactly what

TABLE 25. SPEARMAN-BROWN SPLIT-HAIF RELIABILITY COEFFICIENTS COMPUTED FROM A SAMPLE OF POST-TESTS (N = 124).

Test	r
Total	.734
Redefinition	.630
Flexibility	.730
Originality-C	.326
Sensitivity	.744
Fluency	.734
Originality-R	.464

TABLE 26. COEFFICIENTS OF AGREEMENT BETWEEN SCORERS COMPUTED FOR A RANDOM SAMPLE OF THREE CLASSROOMS FOR EACH TEST.

Test	Range of coefficients	N
Problems Test (Sensitivity)	.97 to .99	27 to 32
Alternate Uses (Flexibility)	.94 to .98	24 to 27
Consequences (Fluency)	.94 to .99	15 to 36
(Originality--Remote)	.86 to .99	
Plot Titles (Originality--Clever)	.67 to .91	11 to 37

TABLE 27. INTERCORRELATIONS OF A SAMPLE OF 107 CASES ITEM SCORES.

	Total Test	Activity Inventory	Nomination	IQ
1 Redef.	.421	.144	.211	.471
2 Redef.	.356	.098	.072	.278
3 Flex.	.751	.171	.277	.582
4 Flex.	.600	.136	.198	.502
5 Orig. C	.563	.197	.311	.368
6 Orig. C	.315	.260	.088	.174
7 Sensi.	.694	.389	.370	.355
8 Sensi.	.654	.319	.258	.209
9 Flu.	.794	.123	.328	.453
10 Flu.	.696	.273	.165	.339
11 Orig. R	.576	.066	.238	.331
12 Orig. R	.515	.287	.183	.255
13 Total		.332	.345	.612
14 Act. Inver.			.262	.050
15 Nom.				.282

For 100 df two-tailed test.

P .05 = .195

P .01 = .254

TABLE 28. CORRELATIONS OF TOTAL CREATIVITY (POST-TEST), PEER NOMINATION, INTEREST INVENTORY AND IQ FOR VARIOUS GROUPINGS OF SUBJECTS.

Grouping	Act.	Nom.	IQ	N
Total	.332**	.345**	.612**	107
IQ 90-	.237	.331	-.174	12
IQ 91-119	.407**	.288*	.439**	72
IQ 120+	.238	.242	.044	23
Females	.290	.373**	.596**	50
Males	.367**	.421**	.612**	57
SE Status 1&2	.642*	.379	.744**	12
SE Status 3	.053	.496	.820**	14
SE Status 4	.379	.388	.327	11
SE Status 5	.476	.287	.496**	27
SE Status 6	.156	.323	.551**	26
SE Status 7	.591*	.561*	.521	13

* p < .05

** p < .01

might be expected since these students would more likely have the necessary background to perform well on both measures. The relationship of creativity to criterion measures, Peer Nomination and Activity Inventory is stronger for males than for females. The Activity Inventory also appears to be a stronger predictor of creativity for the extremes of socio-economic status than for levels between.

Construct Validity

Construct validity was estimated by factor analyzing the items to determine if the obtained factors were congruent with factors obtained by Guilford with other samples and in his previous sixth grade sample (Merrifield, et. al., 1963, 1960; Guilford, et. al., 1952, 1954, 1956; Hoepfner and Guilford, 1965).

Factor-Analysis Procedures. Since many of the score distributions were positively skewed and some were truncated, following Merrifield, Guilford and Gershen (1963), the distributions were dichotomized at the medians and a phi coefficient was computed to form a correlation matrix to be factor analyzed. This matrix is shown in Table 29.

In accordance with the BMD 03M program, using squared multiple correlations as estimates of communalities, a principal-components factor solution was effected in which all factors having eigenvalues greater than zero were extracted. Table 30 presents the principal-factor matrix. It will be noted that eight factors were extracted accounting for 100.43 per cent of the total communality. The first five factors accounted for 97.39 per cent of the communality.

Seven factors were included in an orthogonal rotation of the factor matrix. This rotated factor matrix is presented in Table 31. It will be observed that two factors had no significant loadings (commonly considered .30 or above) and were referred to as residual factors. Five factors were left to be interpreted.

Factor interpretation. The significant factors which were interpreted are presented in Table 32. In spite of the limitations of this factor analysis, three of the hypothesized factors appeared to be supported thus providing construct validity for these tests. A fourth factor was implied.

Clearly emerging was redefinition or Guilford's convergent production of semantic transformations (NMT). The split-halves of the Gestalt Redefinition test loaded on this factor .54 and .45. Also loading on this factor was I.Q. at .41. Since this factor, unlike the others, is concerned with convergent production, the relationship to I.Q. is logical.

Another clear factor was DMC, divergent production of semantic classes, or flexibility. The two Alternate Uses tests loaded on this factor at .45 and .51. Also loading on this factor was the Problems Test, Part 1 which purports to measure sensitivity to problems. This was a secondary loading for this variable. It will also be noted that Alternate Uses I had a secondary loading on EMI, sensitivity to problems. The relationship between sensitivity and flexibility is not entirely unexpected. A similar finding was obtained in Guilford's junior high school group (1961). Since sensitivity

TABLE 29. INTERCORRELATIONS OF TEST ITEMS FOR A RANDOM SAMPLE OF POST-TESTS (N=107) USING PHI COEFFICIENTS

Items*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1		.319	.150	.231	.062	.016	.027	.093	.151	.034	.173	.020	.277	.069	.142	.326
2			.121	.096	.023	.058	.028	.088	.029	.112	.028	.036	.150	.103	.039	.215
3				.376	.158	.030	.348	.324	.373	.264	.224	.173	.472	.181	.174	.279
4					.111	.073	.264	.148	.225	.267	.164	.185	.450	.014	.003	.375
5						.054	.135	.059	.143	.049	.056	.019	.158	.049	.108	.119
6							.074	.030	.028	.024	.040	.011	.091	.034	.009	.051
7								.409	.365	.236	.402	.280	.551	.177	.207	.262
8									.367	.245	.290	.284	.472	.223	.181	.187
9										.405	.676	.315	.542	.073	.339	.340
10											.440	.679	.539	.060	.036	.336
11												.418	.468	.037	.182	.280
12													.429	.045	.074	.329
13														.121	.147	.459
14															.185	.102
15																.174
16																

*1,2 Halves of Redef. test (alternate items)-(redef.)
3,4 Items of Alternate Uses Test (flexibility)
5,6 Items of Plot-titles (Orig.-C)
7,8 Items of Seeing Problems (Sensitivity)
9,10 Items (2 each) of Consequences Test Scored for Fluency
11,12 Items (2 each) of Consequences Test Scored for Originality-remote
13 Total Post-test
14 Activity Inventory
15 Peer Nomination
16 I.Q.

TABLE 30. PRINCIPAL-FACTOR SOLUTION FOR 15 VARIABLES*

	Variable	I	II	III	IV	V	VI	VII	VIII	h^2
1	Gestalt Redefinition 1	.238	.409	-.212	-.214	-.086	-.038	-.019	-.015	.324
2	Gestalt Redefinition 2	.169	.291	-.237	-.080	-.189	-.099	.015	.048	.222
3	Alternate Uses 1	.516	.242	.041	.179	.133	.024	-.092	.045	.386
4	Alternate Uses 2	.424	.212	-.241	.088	.289	-.004	-.012	-.016	.375
5	Plot Titles 1	.172	.158	.070	.052	.066	.154	.078	.037	.097
6	Plot Titles 2	.071	.066	-.014	.040	.035	-.037	.170	.043	.043
7	Seeing Problems 1	.553	.050	.213	.211	.063	-.076	.065	-.050	.414
8	Seeing Problems 2	.498	.058	.183	.200	-.125	-.115	-.049	-.006	.357
9	Consequences Total 1	.721	-.052	.266	-.262	.075	.027	-.041	.032	.671
10	Consequences Total 2	.635	-.346	-.298	.059	-.065	.055	-.021	.049	.624
11	Consequences-Remote 1	.665	-.250	.181	-.240	.050	-.094	.044	.009	.610
12	Consequences-Remote 2	.591	-.392	-.247	.099	-.141	.041	.013	-.036	.596
13	Activity Inventory	.194	.200	.133	.191	-.225	.039	.015	.023	.185
14	Peer Nomination	.298	.180	.273	-.101	-.166	.131	.000	-.036	.251
15	I.Q.	.542	.207	-.246	-.090	.007	.050	.038	-.059	.410
	Total	—	—	—	—	—	—	—	—	5.565
	Contribution of factor	3.262	.847	.654	.377	.281	.092	.057	.021	5.591
	Percent of total h^2	58.61	15.22	11.75	6.77	5.04	1.65	1.02	.37	100.43

*Squared multiple correlations were used as estimates of communalities.

TABLE 31. ROTATED FACTOR MATRIX*

	Variable	I	II	III	IV	V	VI	VII	h^2
1	Gestalt Redefinition 1	-.029	.541	.082	.036	.124	.077	.028	.324
2	Gestalt Redefinition 2	.051	.452	-.034	.097	.028	-.027	.057	.222
3	Alternate Uses 1	.125	.136	.189	.302	.456	.115	.056	.386
4	Alternate Uses 2	.179	.225	.070	-.001	.511	.074	.142	.375
5	Plot Titles 1	-.010	.035	.064	.114	.140	.224	.092	.097
6	Plot Titles 2	.007	.036	.009	.027	.038	.023	.196	.043
7	Seeing Problems 1	.187	-.040	.317	.382	.301	.027	.195	.414
8	Seeing Problems 2	.195	.044	.256	.458	.185	-.049	.059	.357
9	Consequences Total 1	.246	.089	.714	.166	.202	.150	.000	.671
10	Consequences Total 2	.737	.082	.204	.052	.171	.001	.010	.624
11	Consequences-Remote 1	.368	.011	.672	.077	.101	-.008	.080	.610
12	Consequences-Remote 2	.737	.027	.181	.106	.081	-.022	.026	.596
13	Activity Inventory	.013	.094	.003	.406	.015	.094	.042	.185
14	Peer Nomination	-.033	.124	.300	.298	-.029	.231	-.028	.251
15	I.Q.	.293	.412	.192	.076	.276	.152	.110	.410

*Squared multiple correlations were used as estimates of communalities.

TABLE 32. FACTOR INTERPRETATION*

	Variable	DMT-DMU I	NMT	DMT-DMU II	EMI	DMC
1	Gestalt Redefinition 1		.541			
2	Gestalt Redefinition 2		.452			
3	Alternate Uses 1				.302	.456
4	Alternate Uses 2					.511
5	Plot Titles 1					
6	Plot Titles 2					
7	Seeing Problems 1			.317	.382	.301
8	Seeing Problems 2				.458	
9	Consequences Total 1			.714		
10	Consequences Total 2	.737				
11	Consequences-Remote 1	.368		.672		
12	Consequences-Remote 2	.737				
13	Activity Inventory				.406	
14	Peer Nomination			.300	(.298)	
15	I.Q.	(.293)	.412			

*All variables with loadings of .30 or above were considered significant for interpretation purposes.

is considered a basic attribute to the other creative aspects this is also a logical relationship (Guilford, 1957). One would need sensitivity to a variety of possibilities in order to be flexible rather than having a mind set.

The factor, EMI, evaluation of semantic implications, or sensitivity, was obtained with both of the Problems Tests loading at .38 and .45. One Problems test (Problems 1) had secondary loadings on DMT-DMU II (.31) and DMC (.30). It will also be noted in the preceding discussion that Alternate Uses 1 had a secondary loading of .30 on EMI. The Activity Inventory had a loading of .40 on EMI which also appears to be a logical relationship since the more sensitive person would be more likely to have a variety of interests and thus have a higher activity score.

Two factors combining DMT and DMU were obtained. It appears obvious that the high correlation between the fluency and originality scoring procedures resulted in a failure of the scores to separate as different factors. Guilford's procedure was to score Fluency as the total number of obvious responses and Originality-remote as the number of remote responses. In this study Fluency was the number of both obvious and remote responses, thus resulting in a lack of independence for the two scores.* Some indication of validity is evident, however, in that the two items hypothesized as measuring Originality-remote (DMT, divergent production of semantic transformations) load together on DMT-DMU I at .36 and .73. It will also be noted that Peer Nomination (a measure of originality of ideas) loads at .30 on DMT-DMU II.

The Plot Titles test items do not load significantly on any factors due to their low communalities, .09 and .04.

It would appear reasonable to conclude that a satisfactory degree of construct validity exists for the revised tests of Redefinition (Gestalt transformation), Sensitivity (Seeing Problems), and Flexibility (Alternate Uses).

Item Analysis

Gestalt Redefinition Test. Reliabilities of this test are adequate. Split-half r = .63 and test-retest r = .56. Since the test is objectively scored no inter-scorer correlation was computed.

The Gestalt Redefinition Test was not as highly correlated with the total creativity battery score as other tests in the battery (r = .57). Its relationship to I.Q. was also relatively low (.443). It does not appear to overlap the other items in the battery. Construct validity was supported in the factor analysis. It would appear, as indicated by Guilford

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* Although the reasons for the DMU-DMT combination appears to be the lack of independence in the scoring procedure, it is interesting to note that Guilford (1967 p. 453) indicates that summing both remote and obvious scores would give a measure of both DMU and DMT with DMU dominant "... because it has been the writer's experience that the variance of scores for obvious consequences is about double that for remote consequences".

(1957) to measure a convergent aspect of the intellect as compared with the other items which appear to measure divergent aspects.

It will be observed that the odd items of the test contribute most to the relationship to Peer Nomination and Activity Inventory measures, as well as to I.Q. Furthermore, there is considerable difference between the communalities of the alternate items which may be considered an estimate of their reliabilities (.32 and .22). A reexamination of the wording of the items and their difficulty is suggested.

Alternate Uses Test. This test has a very respectable split-half reliability (.73) as is its test-retest reliability (.67). There is also scorer agreement (.94 to .98).

The test contributes substantially to the total battery score with r = .80. This test also has the highest correlation with I.Q. (r = .53). Construct validity was supported by the factor analysis.

The two items making up Alternate Uses 1 and 2 appear to be comparable in terms of validity, both correlating comparably with total battery score, and with the criterion variables. It will be noted, however, that Alternate Uses 1 had a secondary loading of .30 on the EMI, sensitivity factor, indicating a certain degree of sensitivity contributing to a score of this item not evident on the other item. Although not appearing in the factor analysis it was observed (in Table 23) that the Alternate Uses 1 item had a higher correlation with Consequences 1 (Fluency) than with its mate. Otherwise there does not appear to be a serious overlap problem.

Plot Titles Test. This test had the lowest reliability of any test in the battery (split-half = .32 and test-retest = .49). Agreement between scorers was also lower (.67 to .91). An obvious needed correction would be a more detailed scoring guide to increase objectivity of scorer judgment of the clever responses.

Correlations with criterion variables were low for this test. Construct validity was not established by the factor analysis.

It would appear that Plot Titles 1 was more highly correlated with total battery, Peer Nomination and I.Q. than Plot Titles 2. However, two had a higher correlation to Activity Inventory. Plot Titles 1 had a higher correlation with Consequences 1 (Fluency) than to any other subtest. One might conclude, therefore, that the two items were not comparable with one being either easier or more easily scored than two.

Seeing Problems Test. This test had high reliabilities of .74 for split-half and .58 for test-retest. Scorer agreement was very high (.97-.99).

The test contributes substantially to the battery score (.76) and also has significant positive correlations with Activity Inventory and Peer Nomination measures. Correlation with I.Q. is .40, about the same as with the other tests. Construct validity was supported in the factor analysis.

Both Seeing Problems 1 and 2 seem to be equally valid, correlating

similarly with total battery and Activity Inventory and Peer Nomination. When examining relationships to other tests (Table 23) it is observed that these items correlate higher with the Consequences Tests than with the others in the battery. Although not borne out by the current factor analysis, the relationship of sensitivity to fluency and originality has been observed in other studies of those tests. Guilford points out that sensitivity to problems, while not a divergent aspect of the intellect, is a necessary pre-requisite to divergent production (Guilford, 1957).

Consequences - Fluency. Relatively high reliability coefficients were obtained. Split-half reliability was .73 and test-retest was .60. Scorer agreement ranged from .94 to .99.

The fluency score made the highest contribution to the total battery score ($r = .84$). It was also positively and significantly correlated to Activity Inventory (.18) and Peer Nomination (.26). Relationship to I.Q. was .48. Construct validity was not clear since the scoring procedure did not allow independent scores for fluency and originality-remote (see preceding discussion).

There appear to be some differences between the two items when examining the correlations with the criterion variables and their contribution to total battery score. Consequences 1 (Fluency) also correlates higher with Alternate Uses 1 (.65) than it does with any other item other than itself scored for Originality-remote. A reexamination of these items would seem desirable.

Consequences (Originality-remote). Reliabilities for the Consequences tests were low. Split-half $r = .46$ and test-retest $r = .31$. Scorer agreement ranged from .86 to .99. Evidently the judgment involved in determining a remote as compared to obvious response was a factor in the lower reliabilities. This conclusion is supported when the alternate, frequency of response method, is compared (see the discussion of this procedure and the findings when compared).

Consequences 1 and 2 appear to make a comparable contribution to the total battery score (.57 and .51) and the combined score for Consequences (Originality-remote) correlates .70 with total battery score. Relationships with criterion variables are positive and significant (.15 with Activity Inventory and .24 with Peer Nomination). Correlation with I.Q. is .41. Construct validity was not clear due to the lack of independence of the Originality-remote score and the Fluency score. However, it will be noted that Consequences 1 scored for Originality-remote had a secondary loading of .36 on the same factor on which Consequences 2 (Originality-remote) loaded at .73.

There is a considerable variation in parts 1 and 2 and their relationship to Peer Nomination and Activity Inventory (Peer Nomination $r = .06$ and .28 and Activity Inventory $r = .23$ and .18). However, both items appear to be comparably related to the total battery score. Consequences 1 (Originality-remote) appears to share some variance with Alternate Uses 1 (.42) and Seeing Problems 2 (.44). However, no serious overlap is evident.

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Summary

A revised battery of Guilford's tests was administered to a group of approximately 900 sixth grade children in central Indiana in 1965-66 as part of a project jointly sponsored by Indiana University and the U. S. Office of Education.

The Problem. The purpose of the present study was to conduct a detailed analysis of the Indiana test data. It was believed that dissemination of the results of these tests would serve as a source of comparison by school personnel should they administer the same or similar tests. Furthermore it was believed that the analysis would also contribute to the basic store of knowledge regarding the "creative" aspects of the intellectual purported to be measured by these tests.

The objectives of the study were: 1) to establish norm data from the battery of creativity tests, 2) to obtain frequency of response scores for the originality sub-test to compare these scores with scorer judgment type "remote" scores initially obtained, 3) to perform an item analysis for each item in the battery of tests, 4) to analyze and report on the relationships of measured creativity, socio-economic status, I.Q. and sex, with validity estimates (criterion) obtained from a peer nomination and interests and activity inventory, 5) to analyze construct validity by conducting a factor analysis of the test data.

Procedures. The objectives of the study were accomplished in two phases: those dealing with the further analysis and development of the test battery; and analysis concerned with exploring relationships of creativity with other variables for the population tested.

Means, standard deviations, minimum and maximum scores were computed for the total population and for sub-divisions of sex, I.Q., socio-economic level and age. These were computed for both pre and post test data and were used to establish norms for this population. Furthermore, the t test was applied to detect significant mean differences between levels.

The originality test, initially scored using judgment of "remoteness" by trained persons was rescored on a frequency basis. Individuals' frequency scores were compared with originality scores in an effort to determine equivalency of the two procedures. Additionally, responses were compared to see if there were meaningful differences in frequency and type of response between levels of sex, I.Q., and socio-economic status. Comparison by frequency scores with remote judgment scores was made using correlation analysis. The chi square test was used to select significantly different frequencies of responses between levels.

Estimates of reliability of the tests were obtained by intercorrelation of items and by test-retest and by split-half coefficients for the total test and its sub-tests. A further index of reliability (objectivity) was obtained by examination of scorer agreement.

Two types of validity were examined. Concurrent validity was estimated by determining relationships of the test items, sub-test and total test scores with two independent measures of creativity. These independent measures were peer nomination and activity inventory scores. Construct validity was estimated by factor analyzing the test data to see if the items resulted in each of the factors that Guilford had previously identified.

The intercorrelation of items with sub-test and total test scores and correlation with the criterion measures of peer nomination and interest inventory scores was examined to indicate overlap of items, item validity and reliability.

Conclusions

The following general conclusions were drawn from the findings.

Norm data. It was concluded that the battery should be revised to provide a lower limit for the sub-tests and to result in less skewing of some of the sub-tests, especially Plot Titles (originality-clever) and Consequences (originality-remote).

It was concluded that with the exception of the Redefinition test the sub-tests in the battery appeared to favor females.

It was further concluded that there were significant differences on creativity test mean scores between levels of intelligence.

Differences between age levels were observed but it could not be concluded whether these differences were related to age or to intelligence since older children might have been retained in sixth grade.

It was concluded that the written test and content of all items was biased in favor of the upper socio-economic level student.

Frequency Scoring of the Consequences Test. Although it was not possible to make a definite conclusion there was considerable evidence to indicate the remote judgment method of scoring the Consequences Test for originality is not an accurate procedure. This general conclusion is based upon two subordinate conclusions. First, it would appear that the judgment of the remoteness of a response is a function of the scorer's experience with that particular response, rather than whether the response is in reality remote in a particular population of subjects. Secondly, the definitions of originality as infrequency of response and remoteness of response do not appear to be compatible. The remote judgment method, apart from being less objective, as noted above, appears to require abstract thinking and thus be strongly and positively related to I.Q. as compared to the frequency method which was not as strongly related to I.Q.

No conclusions were possible regarding the relationship of responses to levels of socio-economic status. Furthermore, no conclusions were possible relative to unique responses and sex, I.Q. and socio-economic status. There was some evidence to indicate that the less original (more frequent) responses, when boys and girls were compared, support Torrance's hypothesis that conformity is linked to sex roles.

Reliability. Acceptable internal consistency was obtained when intercorrelation of items and correlation with total test score was examined.

Test-retest and split-half reliability was found to be within acceptable limits.

Inter-scorer agreement was high in all cases.

Concurrent Validity. Concurrent validity was considered acceptable with generally low but positively and statistically significant coefficients obtained when creativity measures were correlated with Peer Nomination and Interest Activity scores.

It was also concluded that the creativity test items share considerable variance with I.Q. test scores.

No conclusive generalizations could be made regarding relationships of creativity test scores to criterion measures for levels of I.Q., sex and socio-economic status.

Construct Validity. Based upon a factor analysis of the items comprising the sub-tests of the battery it was concluded that a satisfactory degree of construct validity existed for the revised tests of Redefinition (Gestalt Transformation), Sensitivity (Seeing Problems), and Flexibility (Alternate Uses).

Item Analysis. It was concluded that the Gestalt Redefinition Test, the Alternate Uses Test, the Seeing Problems Test, and the Consequences Test scored for fluency were acceptable, reliable and valid measures of the aspects purported to be measured by these tests and should continue to be included in the battery.

The Plot Titles test needs extensive revision to increase its reliability, to equalize the difficulty of its items and to substantiate its validity.

The Consequences test scored for Originality-remote also needs further revision to increase reliability and to substantiate its validity. It was concluded that a different method of scoring the Consequences Test for Fluency in which both remote and obvious scores were totaled to obtain a fluency score disguised the true validity of the originality-remote score.

Implications

The implication of this study in regard to further use of these tests at this age level would appear to be that the test battery with the exception of the Plot Titles sub-test is a reliable and somewhat valid measure at the sixth grade level. However, distinctions should be made between the sexes and intelligence and socio-economic levels when interpreting scores. The existence, however, of a separate entity apart from intelligence which could be called "creativity" remains questionable and should not be implied from the findings and conclusions of this study.

There are a number of implications for further research which can be derived from this study. First, it would appear that the existence of a separate entity called "creativity" from that measured by standard intelligence tests has not been established in this study but clues are available which indicate further studies should be done to determine the effect of the test situation and the scoring procedures upon the obtained "creativity" scores. This implication was strongly suggested when the frequency and remote methods for scoring the Consequences Test for originality were compared.

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APPENDIX

APPENDIX A. Responses to the Consequences Test and Their Frequency.

RUN 1 - ALL CARDS

			A1
10201	001897	NO GARBAGE COLLECTORS	1
10202	004894	NO GARBAGE TO TAKE OUT	4
10203	001897	NO TOILETS	1
10206	001897	NO EXCRETA	1
10207	004894	NO USE FOR GARBAGE CANS	4
10208	001897	NO GARBAGE DESPOSAL	1
10209	002896	NO GARBAGE TRUCKS	2
10302	002896	NO MORE CAVITIES	2
10303	001897	NO MORE DENTISTS	1
10305	005893	NO NEED TO BRUCH YOUR TEETH	5
10307	001897	YOU WOULDNT GET SICK	1
10402	003895	NO MORE BATH ROOMS	3
10403	004894	MORE ROOM FOR STORAGE	4
10405	002896	KITCHENS COULD BE USED AS RECREATION ROOMS OR FOR A DIFFERENT ROOM	2
10406	015883	SAVE ROOM	15
10501	011887	NO LIVER	11
10502	016882	NO STOMACH	16
10503	001897	SAVE MONEY	1
10504	003895	NO TASTE BUDS	3
10505	002896	NO INTESTINES	2
10508	001897	NO LIVER	1
10509	007891	NO DIGESTIVE SYSTEM	7
10510	001897	FEWER PIMPLES	1
10511	002896	NO GALL BLADDER	2
10512	001897	NO APPENDIX	1
10601	003895	COULD TRAVEL FURTHER	3
10603	001897	SPACE TRAVEL EASIER	1
10605	003895	SAVE GAS	3
10701	002896	FEWER DOCTORS NEEDED	2
10703	002896	NO DRUGSTORES	2
10706	007891	NO NEED FOR VITAMIN PILLS	7
10802	007891	SAVE WATER	7
10804	002896	NO MORE HEALTH BOOKS	2
10805	002896	LESS FAMILY ARGUMENTS	2
10806	001897	NO CHARITY	1
10807	001897	NO NEED FOR FARM MAGAZINES	1
10808	002896	NO NEED TO HAVE A MENU	2
10901	001 897	NO GYMS	1
10903	002896	NO NEED FOR DIFFERENT SIZES OF CLOTHES	2
10906	002896	NO METRACAL OR SEGO DIET FOOD	2
10907	006892	LOSE WEIGHT	6
10908	015883	NO DIETS	14
10909	001897	NO REDUCING MACHINES	1
10910	003895	NO WEIGHT CONTROL PILLS	4
11001	011887	NO NEED FOR SPICES	11
11002	003895	HAVE SMALLER BILLS	3
11003	002896	WORLD OVERRUN BY ANIMALS	2
11004	001897	POPULATION EXPLOSION	1
11005	004894	NO FOOD SPILLED ON CLOTHES	4
11006	003895	SHIPS NOT USED TO CARRY FOOD	3
11007	006892	NO NEED TO HUNT OR FISH	6
11008	007891	NO FOOD COMMERCIALS	7
11009	003895	NO NEED TO WASH HANDS SO OFTEN	3
11010	008890	NO EATING FOOD YOU DIDNT LIKE	8
11011	007891	MORE FACTORIES BUILT ON FARM LANDS	7
11012	004894	NO NEED FOR COOKBOOKS	4
11014	005893	NO FOOD SALES	5
11015	003895	USE LESS ELECTRICITY	3

11018	020878	SAVE LAND	19
11019	001897	HAVE NOTHING BUT DEPARTMENT STORES	1
11020	003895	NO BEING LATE FOR SUPPER	3
11021	002896	ENDANGER THE ECONOMY	2
11022	003895	NO NEED TO THANK GOD FOR FOOD	3
11023	003895	NO ANIMALS ASSOCIATED WITH MANS FOOD	3
11024	002896	NO NEED FOR FERTILIZER	2
11025	001897	NO NEED FOR APPLIANCE DEALERS	1
11026	013885	NO NEED FOR GROCERY SACKS OR FOOD CONTAINERS	13
11027	003895	COULD GET TO SCHOOL ON TIME	3
11028	016882	SAVE HARD WORK FOR MOM IN THE KITCHEN	16
11029	001897	WOULDNT HAVE TO KNOW TABLE MANNERS	1
11030	049849	NO DOING DISHES	49
11031	025874	NO MEALS	25
11032	001897	NO TOOTH BRUSH	1
11033	038860	NO NEED TO COOK	38
11034	002896	NO SETTING TABLES	2
11036	017881	SAVE GOING TO THE STORE	17
11037	001897	NO MORE TV DINNERS	1
11039	001897	NO MORE SCARECROWS	1
11040	001897	NO MORE COUNTRY	1
11041	002896	MORE CITIES	2
11042	001897	NO MORE FOOD SHIPMENTS	1
11043	001897	NO PICNICS	1
11044	001897	NO THANKSGIVING DINNERS	1
11045	002896	NO CANNING	2
11046	014884	NO ANIMALS WOULD BE BUTCHERED	14
11101	002896	NO GREASE	2
11102	012886	NO NEED FOR SOIL	12
11103	001897	NO NEED FOR CAN OPENERS	1
11104	001897	NO NEED FOR WEIGHT SCALES	1
11105	001897	NO MORE BONES FOR DOGS	1
11106	001897	NO MORE JOLLEY GREEN GIANT	1
11107	020878	NO LUNCH HOUR OR COFFEE BREAK	19
11108	006892	NO HALLOWEEN TRICK OR TREAT	6
11109	011887	NO NEED TO WORRY ABOUT LACK OF FOOF	11
11110	006892	NO NEED FOR SUN	6
11201	049849	NO NEED FOR FARMS	47
11203	066832	NO NEED FOR FARM EQUIPMENT	67
11204	007891	NO MORE PRODUCE TRUCKS	7
11205	011887	FARMERS WOULDNT HAVE TO WORK	11
11207	012886	LOSS OF JOBS	13
11208	024874	NO COOKS	24
11209	002896	NO NEED FOR FARM HOUSES	2
11210	009889	NO NEED FOR FARM HOUSES	9
11212	001897	NO USE FOR MILK COMPANIES	1
11213	007891	NO PEOPLE TO OWN STORES	7
11214	001897	NO NEED FOR PEOPLE TO MAKE PLATES	1
11215	003895	NO NEED FOR MEAT PACKING PLANTS	3
11216	003895	NO NEED FOR PLANTATIONS	3
11217	001897	NO LUNCH LADY	1
11218	001897	NO NEED FOR PEOPLE TO MAKE SILVERWARE	1
11219	003895	NO MORE BUTCHERS	3
11220	002896	NO NEED FOR FISHERMAN	2
11221	011887	NO NEED FOR WORKERS ON FARMS	11
11222	001897	NO MILKMEN	1
11223	002896	NO FARM DAY	1
11224	001897	PEOPLE IN FREEZING PLANT OUT OF WORK	1
11225	001897	NO GARDENS	1
11226	002896	MORE PEOPLE WORKING IN FACTORIES	2

E1227	001897	NO NEED FOR HUNTERS	1	A3
11228	001897	NO MORE RANCHES	1	
E1229	007891	FARMERS WOULD GO OUT OF BUSINESS	7	
11301	047851	NO RESTAURANTS	46	
11302	E32766	NO FOOD MARKETS	130	
11303	001897	NO CHINA FACTORIES	1	
11304	002896	NO SNACK BARS	2	
11305	016882	CANNERIES ELIMINATED	16	
11307	005893	NO MORE STORAGE	4	
11308	016882	NO CAFETERIAS	15	
11309	003895	STORES NOT SO BIG	3	
11310	003895	NO PACKING COMPANIES	3	
11311	003895	NO FRUIT OR VEGETABLE STANDS	3	
11312	003895	NO BAKERIES	3	
11313	011887	NO FOOD FACTORIES	11	
11314	001897	NO NEED FOR LUNCH ROOMS	1	
E1401	003895	MORE TIME FOR TV	3	
E1402	014884	COULD STUDY LONGER	14	
E1405	029869	COULD PLAY MORE	29	
E1406	050848	COULD DO MORE WORK WITHOUT STOPPING	50	
11407	016882	MORE SLEEP	16	
11408	002896	BE ON THE GO ALL THE TIME	2	
E1409	033865	SAVE TIME	34	
E1410	001897	MORE TIME WITH THE CHILDREN	1	
11411	012886	COULD DO MORE THINGS	12	
11412	001897	MORE READING	1	
11413	005893	HAVE MORE FUN	5	
E1501	E38760	PEOPLE HAVE MORE MONEY	138	
11503	002896	COULD BUY MORE OF OTHER THINGS	2	
E1601	015883	NO STARVATION	15	
11602	001897	NO MORE MALNUTRITION	1	
E1603	005893	NO STOMACH ACHES	5	
11604	007891	NO MORE DISEASES FROM FOOD AS FOOD POISONING	7	
E1605	004894	NO MORE UPSET STOMACHES	4	
11606	002896	YOU WOULDNT GET SICK FROM EATING	2	
E1607	001897	NO WEIGHT PROBLEMS	1	
E1608	002896	NO ONE WOULD VOMIT OR CHOKE	2	
E1701	046852	NO MORE DISHES	45	
11702	066832	NO MORE KITCHENS	66	
11703	005893	NO MORE DINING ROOMS	5	
11704	042856	NO MORE COOKING PANS	42	
E1705	010888	NO MORE NEED FOR NAPKINS	10	
11706	I67731	NO STOVES	167	
11707	025873	NO DINING OR KITCHEN TABLES	24	
E1708	025873	NO CABINETS	25	
E1709	053845	NO NEED FOR SILVERWARE	53	
E1710	002896	NO BAR	2	
11711	005893	NO CLOCK	5	
E1712	011887	NO TABLE CLOTHS	11	
E1713	001897	NO STRAWS	1	
11714	003895	NO FOOD SHELVES	3	
11715	003895	NO DISH CLOTHS	3	
11716	003895	NO MIXERS	3	
11717	004894	NO DISHWATER SOAP	4	
11718	018880	NO DISHWASHERS	17	
11719	002896	NO HIGH CHAAIRS	2	
11720	001897	NO POPCORN POPPERS	1	
11721	001897	NO APPLIANCES	1	
E1722	003895	NO KITCHENS OR DINING CHAIRS	2	
11723	001897	NO BREAD BOXES	1	

11925	001897	NO NEED FOR A GRILL	1
11926	001897	NO COOK WARE	1
11927	002896	NO NEED FOR UTENSILS	2
11928	001897	NO TOASTER	1
11929	001897	NO HOT PLATES	1
11900	002896	WE WOULD LIVE DIFFERENT	2
11901	077821	NO GARDENS	76
11902	027871	NO GAINING WEIGHT	27
11903	093805	NO NEED FOR MEAT PRODUCING ANIMALS	92
11904	029869	NO MORE FEELING OF HUNGER	29
11905	001897	WOULDNT HAVE TO CARRY HEAVY GROCERIES ANY LONGER	1
11907	017881	NO NEED FOR FARMING	17
11908	084814	NO SPECIFIC FOODS	84
11909	002896	FOOD WOULD GO TO WASTE	2
11910	003895	NO GREEN HOUSES	2
11911	001897	NO IRRIGATION	1
11912	033865	NO SEEDS	33
11915	003895	WOULD NEED SOMETHING ELSE TO MAKE BODY ENERGY	3
11916	002896	ONLY FLOWERS IN GARDENS	2
11917	022876	NO FARM ANIMALS	22
11918	021877	NO HARVEST	21
11919	021877	NO FRUIT TREES	20
11920	001897	WOULDNT HAVE THE SAYING HOW THE COOKIES CRUMBLES	1
11921	001897	FOOD SOURCES WOULD BECOME WILD	1
11922	001897	NO NEED FOR RAISING ANIMALS	1
11923	001897	NO OXYGEN FROM PLANTS	1
20101	002 896	WATER PIPED FROM EAST	1
20102	004 894	USE WATER FROM CACTUS	2
20103	001 897	TURN SOME RIVERS AROUND	4
20107	004 894	GET WATER FROM OCEAN	1
20108	003 895	DIG A WELL	4
20109	001 897	NEED TO DIG CANALS	3
20110	001 897	DISCOVERIES THAT MAKE RAIN CLOUDS	1
20111	001 897	MORE RAIN DANCES	1
20112	001 897	MORE WATER PURIFIER COMPANIES BUILT	1
20113	001 897	CARRY WATER THROUGH PIPES	1
20114	001 897	GET WATER FROM MOUNTAIN STREAMS	1
20201	001 897	MORE AIR CONDITIONERS	1
20202	002 896	NO PLUMBERS	1
20203	001 897	STOP MUCH TRADE	2
20204	002 896	SALT LAKE DRY UP	1
20205	001 897	WOOD WOULD ROT	2
20207	001 897	NO SWANS IN WEST	1
20208	002 896	NO LOGGING CAMPS	1
20209	001 897	NO RODEOS	3
20210	004 894	LESS AND NEW CLOTHES WORN	1
20211	002 896	BUILD OASIS IN WEST	4
20212	004 894	NO SEASONS	2
20213	002 896	NO BRIDGES, DAMS, CANALS	4
20214	001 897	ARABIAN HORSES IN WEST	2
20215	004 894	NO MOVIES	1
20216	001 897	GET BAD SUNBURN	3
20217	001 897	NIGHTS COOLER, DAYS HOTTER	1
20218	001 897	NEED MORE SUN GLASSES	1
20220	007 891	MORE SAND STORMS	1
20221	002 896	NO DROWNING	7
20222	016 882	POPULATION DROP IN US	2
20223	001 897	LOGGERS WOULD STARVE	15
20224	007 891	NO HOLLYWOOD	1
20225	001 897	GOVERNMENT WOULD SAVE MONEY	7
			1

A4

20226	013 885	CAMELS USED	11 A5
20227	001 897	BUILD ARMY BASES IN EAST	1
20228	001 897	INDIANS HAVE LAND BACK	1
20229	005 893	GROUND BECOME CRACKED	5
20230	001 897	BUILD GIANT SAND CASTLES	1
20231	005 893	NO BOATING	5
20232	007 891	VACATION SPOTS GONE	7
20233	001 897	GIANT SAND BOX	1
20234	011 887	GHOST TOWNS IN WEST	11
20235	006 892	NO ROADS	6
20236	014 884	FEWER PARKS	13
20237	014 884	DIRT BECOME SAND	14
20238	010 888	BEAUTIFUL LAND DESTROYED	10
20239	003 895	COWBOYS HAVE NO JOBS	3
20240	015 883	MORE WASTELAND	15
20242	002 896	NO HOUSE BOATS	1
20243	004 894	NO IRRIGATION	5
20244	004 894	NO WATER FAUCETS, PIPES, PUMPS	4
20245	001 897	NO WINTER OLYMPICS THERE	1
20247	001 897	NO MORE ZOOS	1
20248	002 896	NO MISSISSIPPI RIVER	2
20249	002 896	SNOW MELT ON MOUNTAINS	2
20250	013 885	NO FISHING OR HUNTING	13
20251	007 891	DESERT ANIMALS LIVE THERE	7
20263	001 897	SINUS SUFFERERS WOULD NOT LEAVE	1
20265	001 897	HAVE A SAND FIGHT	1
20266	003 895	NO COATS, SLACKS, SOCKS, WINTER CLOTHES	4
20267	001 897	NO HEATERS	1
20268	005 893	LACK OF PRODUCTS	4
20269	002 896	ARABS WOULD LIVE THERE	2
20281	001 897	NO GRAND CANYON	1
20282	005 893	NO TUBS, SINKS, BUCKETS	5
20283	007 891	NO WATER POWER	7
20284	001 897	BLISTERS ON YOU	1
20286	001 897	OCEAN WOULD GO DOWN	1
20287	002 896	ATOM BOMB TESTING GROUND	2
20288	001 897	YOU WOULD SEE CARAVANS	1
20289	002 896	DISNEYLAND OUT OF BUSINESS	2
20270	002 896	NO MOUNTAINS	2
20271	003 895	NO SKIING, SLEDDING, ICE SKATING	3
20272	001 897	LAND WOULD BE DUST	1
20273	004 894	NO GOOD SOIL	4
20274	001 897	LIVE IN TENTS	1
20275	001 897	PEOPLE THERE FOR MINERALS	1
20276	001 897	NO ARMY BASES THERE	1
20277	004 894	WEST NO LONGER FAMOUS	4
20278	001 897	WATER COSTS LOTS OF MONEY	1
20279	001 897	NO RED WOOD TREES	1
20281	001 897	COULDNT ENJOY THE WEST	1
20282	004 894	MORE FIRES	2
20283	005 893	FEWER STATES	5
20284	005 893	NO AIR POLLUTION IN CALIFORNIA	5
20285	004 894	CANT MAKE WOOD HOUSES	4
20286	001 897	NO RAILROAD	1
20288	003 895	THINGS WOULD OVERHEAT	3
20289	001 897	NO LAWN MOWERS	1
20301	006 892	NOT ENOUGH JOBS	6
20302	002 896	HIGHER CRIME RATE IN EAST	2
20303	013 885	NO SWIMMING POOLS	13
20304	002 896	MORE HIGHWAYS IN EAST	2

20305	022	876	NOT ENOUGH FOOD	22
20306	013	885	DISEASE INCREASE	13
20307	001	897	EAST MAKE MORE MONEY	1
20308	002	896	MORE FOOD GROWN IN EAST	2
20310	001	897	MORE TRAFFIC IN N Y C	1
20312	014	884	ANIMALS MOVE EAST	14
20315	001	897	NO SAN FRISKO BAY	1
20316	010	888	IN EAST NEEDED HOUSES,STORES,FARMS,SCHOOLS,HOSPITALS	10
20317	004	894	MORE FACTORIES IN EAST	4
20318	002	896	SWIMMING POOLS CROWDED	2
20319	010	888	LACK OF ROOM FOR HOMES, SCHOOLS, FARMS	9
20320	010	888	LESS LAND PER OWNER	9
20321	002	896	MORE PRODUCTION IN EAST	2
20322	002	896	NEW FRIENDS AND HOMES	2
20323	002	896	DOCTORS AND MEDICINE NEEDED	2
20324	001	897	SAND BLOWN EAST	1
20325	002	896	LESS SPACE TO GROW FOOD	2
20326	001	897	LACK OF CLOTHES	1
20401	001	897	MEN COULDNT SHAVE	1
20402	006	892	LOST OF MONEY	6
20403	001	897	NO DRINKS LIKE KOOL-AIDE	1
20404	004	894	PEOPLE LOSE JOBS	4
20405	001	897	THINGS GO OUT OF BUSINESS	1
20406	017	881	PEOPLE MOVE TO OTHER COUNTRIES	17
20407	001	897	EAT SEA FOOD	1
20408	001	897	PLANES LAND ANYWHERE	1
20409	004	894	NO BIG GAME IN WEST	4
20410	001	897	NATION BECOME POOR	1
20412	002	896	MORE IMPORTING DONE	2
20413	001	897	RUSSIA WOULD TAKE OVER	1
20414	001	897	AIRLINES OUT OF WORK	1
20415	004	894	NOMADS WOULD LIVE THERE	4
20416	003	895	MANY FUNERALS, KILLINGS, DEATHS	3
20417	001	897	WE WOULD BE CONQUERED	1
20418	001	897	LESS OXYGEN	1
20419	001	897	LESS FLOODS	1
20420	001	897	PEOPLE EAT EACH OTHER	1
20421	001	897	AMERICAN HISTORY WOULD BE DIFFERENT	1
20422	001	897	MORE GO TO CHURCH	1
20423	002	896	HARD TO LIVE	2
20424	001	897	ENDANGER THE ECONOMY	1
20426	001	897	GOLDWATER OUT OF BUSINESS	1
20427	001	897	LITTLE COMMUNICATION	1
20428	001	897	NO RAIN BOW	1
20429	001	897	NO LIFE GUARDS	1
20430	001	897	NO WARS THERE	1
20431	001	897	PEOPLE MOVE TO SHIPS	1
20432	001	897	PEOPLE EXPLORE IT	1
20501	009	889	NO SHADE IN WEST	9
20502	210	688	ANIMALS WOULD DIE	209
20503	049	849	PEOPLE WOULD MOVE	50
20504	062	836	NO SPECIFIC ANIMALS	62
20505	035	863	BE VERY HOT	35
20506	022	876	NOTHING TO DRINK	22
20507	025	873	NO TOWNS IN WEST	25
20508	017	881	FOOD NEEDED	17
20509	003	895	WATER WOULD EVAPORATE	3
20510	037	861	NO HOUSES IN WEST	37
20511	021	877	NO FARMS IN WEST	21
20512	210	688	PLANTS WOULD DIE	206

A6

20613	051	847	FEWER LAKES,RIVERS,PONDS	51	A7
20615	044	854	PEOPLE MIGHT DIE	45	
20616	102	796	GRASS WOULD DIE	102	
20617	030	868	NO RAIN IN WEST	30	
20618	011	887	NO BOATS, DOCKS, BOAT MOTORS	11	
20619	020	878	NO CATTLE THERE	20	
20620	017	881	LOTS OF CACTUS IN WEST	17	
20621	033	865	STARVATION	33	
20622	040	858	DIE FROM LACK OF WATER	40	
20623	012	886	NO SCHOOLS THERE	12	
20624	001	897	NO GAS STATIONS	1	
20625	001	897	NO FISHING HOLES	1	
20626	019	879	NO FRUIT, VEGETABLES, OR MEAT	19	
20627	080	818	COULDNT GROW CROPS	80	
20629	007	891	LESS FACTORIES	7	
20630	003	895	NO RANCHES	2	
20631	001	897	NO HOSPITALS	1	
20632	003	895	NO FURNITURE	3	
20633	005	893	NO STORES	6	
20634	006	892	NO BUILDINGS	6	
20635	002	896	NO NEED FOR HARBORS	2	
20636	003	895	HEAT WOULD KILL PEOPLE	3	
20637	002	896	NO CHURCHES	2	
20638	001	897	NO WATER PUMPING STATIONS	1	
20639	001	897	NO CATTLE RANCHES	1	
20640	006	892	WELLS WOULD GO DRY	6	
20641	001	897	CITIES WOULD CHANGE	1	
20642	006	892	NO FARMERS THERE	6	
20601	019	879	LOTS OF SAND	19	
20602	030	868	WATER NEEDED	30	
20603	029	869	COULDNT STAY CLEAN	29	
20604	018	880	NO VEHICLES IN WEST	18	
20605	003	895	BE A CATASTROPHE, AWFUL	3	
20606	021	877	NO SWIMMING	21	
20607	003	895	PEOPLE GO CRAZY	3	
20608	001	897	COULDNT USE MUCH WATER	2	
20610	005	893	LESS TRANSPORTATION	5	
20611	005	893	COULDNT COOK	5	
20612	001	897	COULDNT WASH CLOTHES	1	
20613	002	896	NO WATER FOR ANIMALS	2	
20614	001	897	CANT GO MANY PLACES	1	
20701	001	897	WATER AND WOOD NEEDED FROM ELSEWHERE	1	
20702	001	897	GO TO SPACE	1	
20703	001	897	FIND WAY TO GET WATER	1	
20704	006	892	MORE IRRIGATION	6	
20705	001	897	BUY MORE LAND	1	
20706	001	897	REBUILD THE WEST	1	
20801	053	846	LACK OF PEOPLE IN WEST	53	
20802	014	884	POPULATION DECREASE IN WEST	13	
20803	009	889	PEOPLE MOVE NORTH OR SOUTH	9	
20804	027	871	CROWDED CITIES AND STATES	29	
20805	116	782	OVERPOPULATED IN EAST	116	
20806	001	897	COULDNT GET WATER	1	
30102	012	886	NO MORE SWIMMING	11	
30103	002	896	SURF AND SKATE BOARDS USED	2	
30104	003	895	NEW CARS BUILT	3	
30105	001	897	CARTS TO MOVE IN	1	
30106	002	896	WOULD FLOAT	2	
30301	001	897	NEED LOWER HOUSES	1	
30303	003	895	LEGS WOULD GIVE OUT	3	

30304	002	896	STRAPS EVERYWHERE	2 | A8
30306	001	897	SHELVES MADE LOWER	1
30307	001	897	ROBOTS USED	1
30308	001	897	PEOPLE NEED TO CHANGE	1
30309	004	894	RAILS EVERYWHERE	4
30310	001	897	PEOPLE TAKE TO WATER	1
30311	001	897	LOW DOOR KNOB	1
30312	001	897	PEOPLE NEED WINGS	1
30313	001	897	INVENT A HEAD PAD	1
30314	001	897	CLOTHES MADE WITH PADS	1
30315	001	897	HEADS LOBSIDED	1
30316	001	897	USE FOR STORES IF STORES MOVED	1
30317	002	896	THINGS PUT LOWER	2
30318	002	896	NEW KIND OF CHAIRS AND BEDS	2
30319	001	897	LOW TABLES AND STOVES	1
30401	024	874	STARVATION	23
30402	015	883	COULDNT READ OR WRITE	15
30403	001	897	NO POINTED OBJECTS	1
30405	001	897	COULDNT WRITE AT BLACKBOARD	1
30406	005	555	COULDNT SEE WELL	5
30407	015	883	NO GAMES PLAYED	14
30408	027	871	CANT GO TO SPECIFIC PLACES	27
30409	004	894	DIE OF THIRST	3
30411	001	897	COULDNT DO HOMEWORK	1
30412	004	894	COULDNT EAT PROPERLY	4
30413	001	897	LOSS OF COMMUNICATION	1
30501	001	897	COULDNT TAKE SHOWER	1
30504	004	894	EVERYONE DIZZY	4
30505	003	895	COULDNT HUNT	3
30506	004	894	COULDNT CLEAN HOUSE	4
30507	002	897	COULDNT CARRY ANYTHING	2
30508	003	895	GOOD POSTURE NOT NEEDED	3
30509	001	897	COULDNT MOW LAWNS	1
30510	002	896	PEOPLELOSE MONEY	2
30511	001	897	HANDS BECOME PAWS	1
30513	010	888	COULDNT REACH HIGH THINGS	10
30514	036	862	NO ACROBATS	38
30518	001	897	CENTER OF GRAVITY LOST	1
30519	001	897	NO TALL DOORS NEEDED	1
30520	001	897	HATS FALL OFF	1
30521	003	895	NO TRICK-OR-TREATING	3
30523	001	897	COULDNT CARE FOR CHILDREN	1
30524	010	888	COULDNT ATTEND JOBS	10
30525	002	896	COULONT FEED PETS	2
30526	002	896	DOCTORS MUST SIT	2
30527	001	897	NO ONE TALL	1
30528	003	895	COULDNT OPEN THINGS	3
30529	001	897	COULDNT CUT TREES	1
30530	001	897	PEOPLE FAINTING	1
30531	001	897	NO DEER SEASONS	1
30532	001	897	DOCTORS COULDNT OPERATE	1
30533	001	897	NO PLAYGROUND	1
30534	001	897	NO STANDING JOBS	1
30535	005	893	LACK OF SPECIFIC JOBS	5
30536	001	897	NO BALANCE BALLS ON NOSES	1
30604	001	897	SOFT SIDEWALKS	1
30605	012	886	NO LEGS	12
30607	001	897	SKYSCRAPERS NEEDED	1
30610	002	896	WOULDNT NEED LADDERS	2
30611	003	895	MORE DROWNING	3

30612	001	897	COULDNT CROSS DEEP WATER	1	A9
30613	004	894	FEET NOT NEEDED	4	
30614	001	897	MASS SIT-IN	1	
30616	001	897	YOU WOULD SEEM DRUNK	1	
30617	001	897	ROBBERS GET MONEY ON GROUND	1	
30618	004	894	NO MORE WARS	4	
30619	003	895	NO ACCIDENTS	3	
30620	001	897	DIE OF SHOCK	1	
30621	001	897	MORE PRAYING	1	
30622	004	894	COULDNT GO UP IN SPACE	4	
30623	010	888	MORE DISEASES	10	
30624	020	888	EVERYONE LIKE BABIES	10	
30625	001	897	LESS MURDERS	1	
30626	001	897	SHORTAGE OF PEOPLE FOR JOBS	1	
30627	001	897	LESS VIOLENCE	1	
30628	005	893	LESS FIGHTING	5	
30629	001	897	NO TREE HOUSES	1	
30630	001	897	PLAY STOOP TAG MORE	1	
30631	001	897	GOD WOULD DO AS HE WANTED	1	
30632	002	896	LACK OF MUSCLES	2	
30633	001	897	LOSE THINGS FROM HANDS	1	
30634	002	896	COULDNT ROB BANK	2	
30635	004	894	NO OLYMPICS	4	
30636	001	897	EARTH TURNING FAST	1	
30637	001	897	COULDNT BURY DEAD	1	
30638	001	897	COULDNT FIRE GUNS	1	
30639	001	897	PEOPLE ALWAYS LATE	1	
30640	001	897	NO GAMES TO TOKYO	1	
30641	001	897	NO MORE PARADES	1	
30701	025	873	HOSPITALS CROWDED	23	
30703	104	794	SOME PEOPLE DIE	102	
30704	004	894	EVERYONE DIRTY	4	
30705	108	790	PEOPLE FALL AND GET HURT	107	
30706	024	874	BUMP INTO EACH OTHER	25	
30707	019	879	MORE DOCTORS, HOSPITALS, NURSES, NEEDED	19	
30708	002	896	MORE AMBULANCES	2	
30709	001	897	DOCTORS MAKE LOTS OF MONEY	1	
30710	001	897	MORE HOSPITAL BILLS	1	
30711	020	878	CAR WOULD BE WRECKED	20	
30712	007	891	PEOPLE GET RUN OVER	7	
30713	003	895	MEDICINE NEEDED	3	
30714	003	895	HARD TO GO TO DOCTOR	3	
30715	001	897	SOME DIE OF HEART ATTACK	1	
30716	001	897	HOSPITALS MAKE MORE MONEY	1	
30717	001	897	AIRPLANES CRASH	1	
30718	001	897	CHILDREN CRYING	1	
30719	001	897	LOTS OF CASTS	1	
30801	069	829	NO CARS, AIRPLANES, TRUCKS, BUSES	68	
30802	004	894	NO TRAINS	4	
30803	093	805	COULDNT DRIVE OR RIDE	93	
30804	018	880	COULDNT TRAVEL	17	
30805	078	820	COULDNT RIDE BIKES	76	
30806	010	888	NO MORE TRANSPORTATION	10	
30807	010	888	COULDNT RIDE HONDAS	10	
30808	007	891	CANT RIDE PONIES	7	
30809	004	894	NO MORE BOATING	4	
30810	001	897	NO TRACTORS	1	
30811	003	895	NO MORE AIRPLANE FLYING	3	
30812	001	897	NO SLEDS	1	
30813	001	897	LESS GAS AND OIL NEEDED	1	

30901	024	874	STAY IN BED	24
30902	017	881	CHAIRS NEEDED	18
30903	026	872	LAY DOWN	26
30904	008	890	EVERYONE BE CLUMSY	8
30905	122	776	EVERYONE CRAWL	120
30906	027	871	PEOPLE LYING EVERYWHERE	27
30907	010	888	GET MORE SLEEP	10
30908	004	894	COOK ON FLOORS	4
30909	001	897	PEOPLE LEAN ON STUFF	1
30910	003	895	PEOPLE WOULD ROLL	3
30911	003	895	MORE BANDAIDS	3
30912	003	895	NEW CLOTHES NEEDED	3
30913	003	895	HOLD ONTO SOMETHING	2
30914	001	897	HAVE TO LOOK UP	1
30915	002	896	NEED CLEAN RUG	2
30916	001	897	STANDS NEEDED	1
30917	001	897	LEAN ON EACH OTHER	1
30918	002	896	MORE PILLOWS AND CUSHIONS	2
30919	001	897	MORE SOFT GRASS	1
30920	001	897	CRAWLING RACES	1
30921	001	897	TAKE LITTLE STEPS	1
31001	029	869	NO SIDEWALKS	29
31002	001	897	NO SHOE MAKERS	2
31003	013	885	SHOES UNNECESSARY	12
31004	007	891	NO ROADS	7
31005	002	896	NO CONCRETE OR CEMENT	2
31006	004	894	NO WALKING ON SIDEWALKS	4
31007	004	894	PEOPLE BECOME LAZY	4
31008	001	897	COULDNT GET TO BATHROOM	1
31009	001	897	FEET WOULDNT GET TIRED	1
31010	003	895	GET FAT	3
31011	001	897	WEAR OUT GRASS	1
31012	002	896	ROADS GROW UP WITH WEEDS	1
31013	002	896	CANT TAKE DOG FOR WALK	2
31014	002	896	NO SOCKS	2
31015	001	897	FORGET HOW TO WALK	1
31016	001	897	NO WALKING CLUBS	1
31101	009	889	WE WOULD BE HELPLESS	9
31105	001	897	NO PEOPLE AFTER A WHILE	1
31108	007	891	TRAGEDY, DISASTER	8
31111	007	891	WOULD BE FUNNY	7
31112	001	897	WORLD NEED HELP	1
31123	004	894	FUNN WORLD	4
31124	014	884	PEOPLE GO CRAZY	14
31115	002	896	HARD TO GO PLACES	2
31126	002	896	PEOPLE ACT STUPID	2
31127	004	894	PEOPLE KILL THEMSELVES	4
31118	001	897	THINGS NOT UNDERSTOOD	1
31119	009	889	SPECIFIC REACTIONS	9
31120	001	897	MORE SORROW AND FEARS	1
31121	004	894	BE MISERABLE	4
31122	001	897	BE AWKWARD WORLD	1
31123	002	896	GET TIRED OF BEING DOWN	2
31124	002	896	MORE CARELESSNESS	2
31125	002	896	A BIG MESS	2
31126	002	896	HARD LIFE	2
31127	002	896	NOT KNOW WHAT TO DO	2
31128	001	897	SOMETHING MUST BE DONE	1
31129	001	897	PEOPLE RESTLESS	1
31130	002	896	LIFE BE DANGEROUS	2

31191	001	897	TIME WASTED	1
31192	001	897	PEOPLE GET PANICKY	1
31193	002	896	WOULDNT LIKE IT	2
31194	001	897	PEOPLE LOSE PATIENCE	1
31195	001	897	PEOPLE WANT TO DIE	1
31196	002	896	NOTHING WOULD BE DONE	2
31197	001	897	EVERYONE TRY TO GET IT BACK	1
31198	001	897	WOULD BE STRANGE	1
31202	001	897	MORE KNEE PADS	2
31204	008	890	COULDNT LIFT THINGS	8
31205	012	886	MORE CRUTCHES	12
31206	035	863	MORE WHEELCHAIRS	35
31208	002	896	NEED FOR WALKERS	2
31209	013	885	BREAK THINGS	13
31210	004	894	NO FACTORIES	4
31211	010	888	NO STORES	10
31212	001	897	NO SHOPPING CENTERS	1
31213	001	897	THINGS SHUT DOWN	1
31214	002	896	WOULDNT NEED TABLES	2
31215	001	897	MORE STROLLERS	1
31301	006	892	NO JUMPING ROPE	6
31302	093	805	COULDNT EAT OR DRINK	92
31304	017	881	NO FARMING	17
31305	017	881	COULDNT BUILD THINGS	16
31306	045	853	NO SPORTS	45
31307	023	875	MORE SITTING DOWN	23
31308	006	892	BABIES COULDNT LEARN TO WALK	6
31309	010	888	COULDNT DANCE	10
31310	001	897	NO SHOWS OF STUNTS	1
31311	001	897	NO DANCERS OR ACTORS	1
31312	002	896	NO BUSINESS MAN	1
31313	047	851	COULDNT RUN, SKIP, KICK	46
31314	003	895	COULDNT PUT CLOTHES ON	3
31315	001	897	CANT COMB HAIR	1
31316	001	897	COULDNT GET IN BED	1
31317	002	896	COULDNT EXERCISE	2
31318	007	891	NO GARDENS	7
31319	002	896	STAY HOME ALL DAY	2
31320	001	897	NO TRAMPOLINES	1
31321	006	892	COULDNT CLIMB	6
31322	001	897	NO SPORTING EQUIPMENT	1
31323	001	897	NO ATHLETES	1
31324	002	896	COULDNT WORK	2
31325	001	897	COULDNT STAND ON HEAD	1
31326	001	897	COULDNT ANSWER PHONE	1
31327	001	897	LACK OF PHYSICAL HEALTH	1
31328	002	896	HARD TO FIX MEALS	2
31329	001	897	COULDNT USE TEETER TODERS	1
31330	001	897	NO STANDING UP ACTIVITIES	1
31331	001	897	NO CHASE ON FOOT	1
40101	001	897	USE OF SIGNS	1
40103	001	897	MEMORIES IMPROVED	1
40104	001	897	READ AS BLIND PEOPLE	1
40105	001	897	PUSH BUTTON WORKERS NEEDED	1
40201	001	897	NO FREEDOM OF PRESS	1
40203	011	887	NO BANKS	11
40204	044	854	NO MONEY	44
40205	006	892	NO PLAYS	6
40206	007	891	NO TAXES	7
40208	008	890	NO PAPER ROUTES	8

40209	021	877	NO BILLS	21	A12
40210	003	895	NO WATCHES	3	
40211	005	893	NO POSTERS	5	
40212	001	897	NO ARCHEOLOGISTS	1	
40213	001	897	NO REPORTERS	1	
40214	012	886	NO CALENDARS	12	
40215	001	897	NO SENATE	1	
40216	003	895	NO INSURANCE	3	
40217	015	883	NO LAWS OR LAWYERS	15	
40218	003	895	NO TELEPHONE BOOK	3	
40219	007	891	COULDNT FLY PLANES	7	
40220	007	891	GET WRONG FOOD	6	
40221	001	897	NO INSTRUMENT LESSONS	1	
40222	006	892	NO MOON TRIPS	5	
40223	020	878	NO LABELS ON THINGS	20	
40225	001	897	STOCK PRICES GO DOWN	1	
40227	006	892	NO CONTRACTS	6	
40228	001	897	NO SHEET MUSIC	1	
40229	006	892	NO CHECKS	6	
40230	012	886	NO ADVERTISEMENTS	12	
40231	001	897	NO BILLFOLDS	1	
40232	010	888	NO TIME	10	
40233	002	896	LESS CARS	2	
40234	002	896	NO MORE VOTES	2	
40235	006	892	COULDNT MAKE THINGS	6	
40236	001	897	NO BLUEPRINTS	1	
40237	001	897	NO BIRTH CERTIFICATES	1	
40238	001	897	NO ASTRONAUTS	1	
40239	003	895	NO SCIENTISTS	3	
40240	001	897	NO SCHOLARS	1	
40241	001	897	NO RENT	1	
40242	001	897	NO STOCK EXCHANGE	1	
40243	002	896	NO NEWS PAPER PRESSES	2	
40244	001	897	NO TREATIES	1	
40245	001	897	NO RECEIPTS	1	
40301	008	890	NO GLASSES NECESSARY	8	
40303	006	892	NO FAMOUS WRITERS	6	
40304	005	893	NO TYPEWRITERS	5	
40305	013	885	COULDNT FINISH THIS TEST	13	
40307	001	897	NO GREAT SPEECHES GIVEN	1	
40308	001	897	TAPE RECORDED BOOKS	1	
40309	014	884	NO SECRETARIES OR OFFICE WORK	15	
40310	005	893	NO LIBRARIANS	5	
40311	001	897	NO BOOK CARDS	1	
40312	003	895	TELEGRAPH WOULD STOP	3	
40313	002	896	NO PENCIL SHARPENERS	2	
40314	004	894	NO PEN PALS	4	
40315	004	894	NO BUSINESS OFFICES	4	
40316	001	897	NO TEST PAPERS	1	
40317	005	893	NO REPORT CARDS	5	
40320	001	897	NO BOOK MARKS	1	
40321	001	897	NO PAPER CUTTERS	1	
40503	002	896	EAT POISON BY MISTAKE	2	
40504	001	897	SMARTER PEOPLE SLAVE US	1	
40505	001	877	MORE SPORTS	1	
40506	001	897	THIEVES ROAM COUNTRY	1	
40602	018	880	MORE ACCIDENTS	18	
40603	003	895	ANOTHER DARK AGES	3	
40605	001	897	MORE SALESMEN	1	
40606	002	896	NO POLICE TICKETS	2	

40607	003	895	GET CHEATED BY LAND SELLERS	3
40608	001	897	NO SIGNING FOR FOOTBALL	1
40609	001	897	COULDNT READ NAMES OF SONGS	1
40610	015	883	NO STORIES	15
40611	001	897	COULDNT TELL SCORE IN BOWLING	1
40612	001	897	NO SORE FINGERS FROM WRITING	1
40613	005	893	WOULDNT USE GOOD ENGLISH	5
40614	001	897	COULDNT GO TO OTHER COUNTRIES	1
40615	001	897	COMMERCE WOULD DROP	1
40616	029	869	NO MAILMAN	29
40617	007	891	WOULDNT KNOW WHERE TO GO	7
40618	003	895	NO SPEED LIMIT	3
40619	002	896	NO USE FOR DRIVERS TEST	2
40621	001	897	WOULDNT KNOW RIGHT MEDICINE TO TAKE	1
40622	003	895	NO READING CLASS	2
40623	001	897	COULDNT IDENTIFY BELONGINGS	1
40624	003	895	NO WRITING CLASS	2
40625	001	897	BOOKS BE ANTIQUES	1
40626	001	897	PRESIDENT COULDNT SIGN BILLS	1
40627	001	897	NO STORYTOWN	1
40701	004	894	NO BOOKS PUBLISHED	4
40702	008	890	DECLINE IN SALE OF PAPER	8
40703	011	887	NO ERASERS	11
40704	121	777	NO PENCILS OR PENS	120
40705	001	897	NO MAGAZINE RACKS	1
40706	004	894	NOT KNOW ABOUT BOOKS	4
40709	004	894	NO NOTEBOOKS	4
40710	002	896	NO STAMPS	2
40711	003	895	NO POST CARDS	3
40712	001	897	NO ENVELOPES	1
40713	008	890	NO CHALK	8
40714	001	897	NO BIRTHDAY CARDS	1
40715	003	895	NO RULERS	3
40716	003	895	NO BOOK STORES	3
40801	005	893	NO RECORDED HISTORY	5
40802	006	892	DECREASE IN COMMUNICATION	6
40803	035	863	END OF POSTAL SYSTEM	32
40804	075	823	NO SIGNS OR MAPS	72
40805	002	896	NO GRADES IN SCHOOL	1
40806	001	897	COULDNT WORK PROBLEMS	1
40807	010	888	NO WRITTEN RECORDS	10
40810	002	896	NO LICENSE	2
40811	001	897	COULDNT READ NAMES OF TOWNS	1
40812	001	897	MIGHT FORGET ALPHABET	1
40813	004	894	NO WRITTEN REPORTS	4
40814	002	896	NO GLOBES	2
40815	001	897	NO MENU	1
40816	001	897	NO NAMES ON MAIL BOXES	1
40817	004	894	NEWS WOULD DECREASE	4
40901	058	840	MORE RADIOS	55
40902	005	893	TELEPHONES USED MORE	5
40903	005	893	TALKING ALL THE TIME	5
40904	003	895	HAVE TO LISTEN	3
40905	001	897	RECORD PLAYERS INCREASE	1
41001	001	897	DECAY OF CIVILIZATION	1
41002	007	891	BUSINESS FAILURES	7
41005	007	891	DO MORE DRAWING	7
41006	001	897	EVERYTHING GO TO WASTE	1
41007	002	896	HAVE TO START OVER AGAIN	2
41008	003	895	PEOPLE IN CONFUSION	3

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41009	002	896	USE SIGNALS	2
41010	003	895	BE A BIG MESS	3
41012	002	896	NO MODERN THINGS	2
41012	001	897	UNORGANIZED GOVERNMENT	1
41013	004	894	BOOK COMPANIES FAIL	3
41015	005	893	PAPER FACTORIES FAIL	5
41016	002	896	PENCIL FACTORIES FAIL	2
41017	003	895	NEWSPAPER BUSINESS FAIL	3
41018	004	894	PEOPLE GO CRAZY	4
41021	001	897	NO PRINT SHOPS	1
41101	003	895	NEW LANGUAGE NEEDED	4
41102	036	862	LESS JOBS	34
41103	019	879	NO ALPHABET	20
41104	234	664	NO BOOKS	230
41105	022	876	NUMBERS NOT NEEDED	22
41106	008	890	GET LESS MONEY	8
41108	100	798	COULDNT READ SPECIFIC THINGS	98
41109	064	834	COULDNT WRITE SPECIFIC THINGS	64
41110	009	889	NO BLACK BOARDS	8
41111	016	882	NO SPELLING	16
41112	001	897	LOSE FRIENDS	1
41113	012	886	NO CLOCKS	11
41114	025	873	NO SCHOOLWORK	25
41115	007	891	PLAY MORE	7
41116	014	884	MORE TV WATCHING	13
41117	001	897	NO SPORTS PAGE	1
41118	001	897	NO TEACHER GETTING NOTES	1
41119	001	897	NO CATELOGUES	1
41120	016	882	NO COMICS	16
41121	006	892	NO REFERENCES	6
41122	006	892	NO MESSAGES	6
41123	001	897	TV PEOPLE MAKE MONEY	1
41125	008	890	NO NOTES	8
41126	004	894	NO BILL BOARDS	3
41127	003	895	BULLETINS OR BOARDS	3
41128	002	896	MORE MOVIES	2
41129	001	897	NO TV GUIDE	1
41130	002	896	NO BIBLE	2
41131	001	897	MORE TIME FOR OTHER THINGS	1

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APPENDIX B. The Test Battery

APPENDIX B

THE TEST BATTERY

1. Gestalt Transformation (Redefinition)

Select one of the five alternative objects, or parts of objects, to be used to serve a stated purpose. A sample item reads: TO LIGHT A FIRE. 1. Cabbage, 2. Fish, 3. Pocket watch, 4. String, 5. Pipe stem. Answer: Pocket watch (use cover as condensing lens). Parts, 1. Items, 10. Working time, 8 min.

Guilford's factor NMT semantic redefinition (convergent production of semantic transformations).

2. Alternate Uses (Flexibility)

List as many as six uses for an object, such as a newspaper, other than the common use, which is stated. Parts, 2. Items, 3 per part. Working time, 8 min.

Guilford's factor DMC semantic spontaneous flexibility. Divergent Production of semantic classes. A revision of his Unusual Uses Test.

3. Plot Titles (Originality-clever)

Write titles for a short story; only clever titles being accepted. Parts, 2. Items per part, 1. Working time, 6 min.

Guilford's factor DMT - Originality (semantic adaptive flexibility) Divergent Production of semantic transformations.

4. Seeing Problems (Sensitivity)

List as many as five different problems connected with a common object. Score consists of all problems dealing with the structure, use or operation of the object. Parts, 2. Items per part, 3. Working time, 8 min.

Guilford's EMI, (Sensitivity). Evaluation of semantic implications.

5. Consequences - Remote Score (Originality-remote)

Give remote (distant in time or in space or in sequence of events) consequences for a specified event. Parts, 4. Items per part, 1. Working time, 8 min.

Guilford's DMT (semantic adaptive flexibility). Divergent production of semantic transformations.

o. Consequences - Total Score (Ideational Fluency)

List consequences of a proposed unusual event. Parts, 4. Items per part, 1. Working time, 8 min. Score is total of obvious and remote responses.

Guilford's DMU (ideational fluency). Divergent production of semantic units.